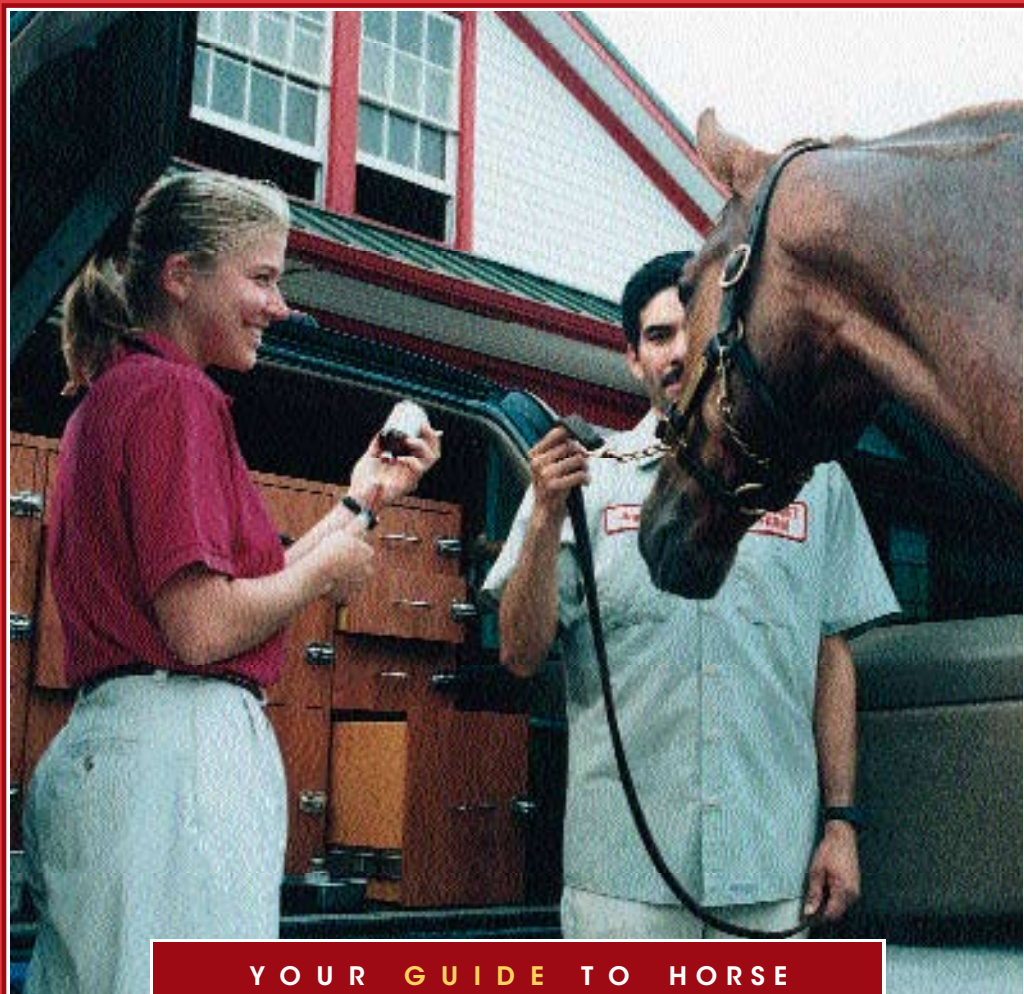


UNDERSTANDING

EQUINE FIRST AID



YOUR GUIDE TO HORSE
HEALTH CARE AND MANAGEMENT

By Michael A. Ball, DVM

UNDERSTANDING
**EQUINE
FIRST AID**

YOUR **GUIDE** TO HORSE HEALTH
CARE AND MANAGEMENT

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Contents

<i>Foreword</i> by Corinne Sweeney, DVM, ACVIM	6
<i>Introduction</i>	8
<i>Chapter 1 The Art of Information Gathering</i>	10
<i>Chapter 2 Knowing Normal from Abnormal</i>	14
<i>Chapter 3 Being Prepared for Emergencies</i>	20
<i>Chapter 4 The Musculoskeletal System</i>	24
<i>Chapter 5 The Gastrointestinal System</i>	36
<i>Chapter 6 The Respiratory System</i>	44
<i>Chapter 7 The Nervous System</i>	50
<i>Chapter 8 Blood Loss</i>	56
<i>Chapter 9 Metabolic Emergencies</i>	62
<i>Chapter 10 Ocular Emergencies</i>	78
<i>Chapter 11 Neonatal Emergencies</i>	86
<i>Chapter 12 Allergic Reactions</i>	104
<i>Chapter 13 Emergency Transportation</i>	108
Glossary of Terms	116
Index	120
Recommended Readings	125
Photo Credits	127
About The Author	128

FOREWORD

First aid is the immediate care given to a victim of an accident, sudden illness, or other medical emergency. Proper first aid can save a horse's life. While emerging diseases often capture the headlines, basic first aid remains a front line topic.

Active horses, like active children (and adults), are prone to a wide variety of emergencies covered in Dr. Michael Ball's book *Understanding Equine First Aid*, including wounds and lacerations, trauma to the head and eye, and exercise-related metabolic emergencies. Accidents happen — but proper first aid doesn't just happen. The horse owner not only needs to want to help his or her horse, the owner must be prepared with facts, skills, and equipment.

Understanding Equine First Aid emphasizes the importance of preparation. Know your horse, know your medical facts, know how to react, know that you have the proper equipment, and you will know that you are a responsible horse owner. Knowing what your veterinarian wants you to do before she/he arrives not only will help your horse, but will allow you to work as a team, assuring the smoothest of operations in what is often a tense and scary time for horse owners. Dr. Ball tells you how this

can be accomplished.

Dr. Ball shares his expertise in internal medicine, providing the reader with up-to-date information on all of the horse's body systems. His emphasis on observations is noteworthy. The veterinarian who arrives on the scene of an emergency only knows what preceded her/his arrival by listening to the horse owner share his/her observations. These shared observations could make the difference in how the veterinarian will subsequently treat the horse ... which may impact the outcome. The reader of *Understanding Equine First Aid* will be better able to provide accurate and more valuable observations.

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INTRODUCTION

The majority of what equine first aid encompasses is simple common sense. When bad things happen to your horses, I hope *Understanding Equine First Aid* will help you recognize the problems sooner and be ready to deal with emergencies with more efficiency because of forethought and planning.

Remember that this book is intended only to help you recognize and better understand some of the more common problems horses will experience in their lifetimes. Such problems include colic, lacerations, hemorrhage, overeating grain, and laminitis, to name a few.

But under no conditions should this book be used solely as your guide for complete diagnosis and treatment. Most of the disease processes and problems presented here should be evaluated by a veterinarian as soon as possible after their recognition. You should never feel awkward about asking a veterinarian to come out and evaluate your horse, even if the basis for your request is just a gut feeling or instinct that something is wrong. Remember, you know your horse better than anybody else and can best determine if it appears to feel well or not.

When one thinks of first aid on humans, the vision is

often of a fairly serious emergency in which paramedics work frantically to administer medical treatment. First aid really encompasses all the things to do first when an accident or injury of any sort occurs. For example, you might obtain important physical information such as temperature, heart rate, and respiratory rate while waiting for your veterinarian to arrive. Or you might apply a pressure bandage to a wound to arrest the bleeding. In some cases the first treatment might be the only treatment necessary; in other cases it might be a life-saving first action followed by weeks or months of additional medical treatment. What you do first can affect the overall outcome of many injuries and illnesses.

In *Understanding Equine First Aid*, I will illustrate the importance of “tuning in” to the condition of your horses in an effort to make it easier to recognize the change when something goes wrong. The promptness with which a problem is recognized can greatly affect the outcome.

I will review how to perform a basic physical examination and to note down measurements that can be a reflection of health. I will also describe how to prepare for emergencies. Then, I will discuss a number of injuries and disease processes. In many cases, the discussion will be brief and is intended only to be a starting point until veterinary consultation can be obtained.

CHAPTER 1

The Art of Information Gathering

When I was a student in veterinary school, I had a professor named Dr. Francis Fox who taught a large animal medicine course. Fox was well-known for his no-nonsense and extremely professional approach to both the teaching and the practice of veterinary medicine.

I believe one of best lectures explained “The art of physical diagnosis.” He said, “If you want to know what’s wrong with the animals, why don’t you just ask them?” Well, at first you’d think this was a lost cause because horses can’t talk. But the more Fox elaborated about the “language” of animals, the more the concept made sense. His emphasis was on the “art” of knowing, understanding, and observing the nature of animals; and, more importantly, on applying this knowledge base to the recognition of abnormality and the association of that abnormality to a specific health problem.

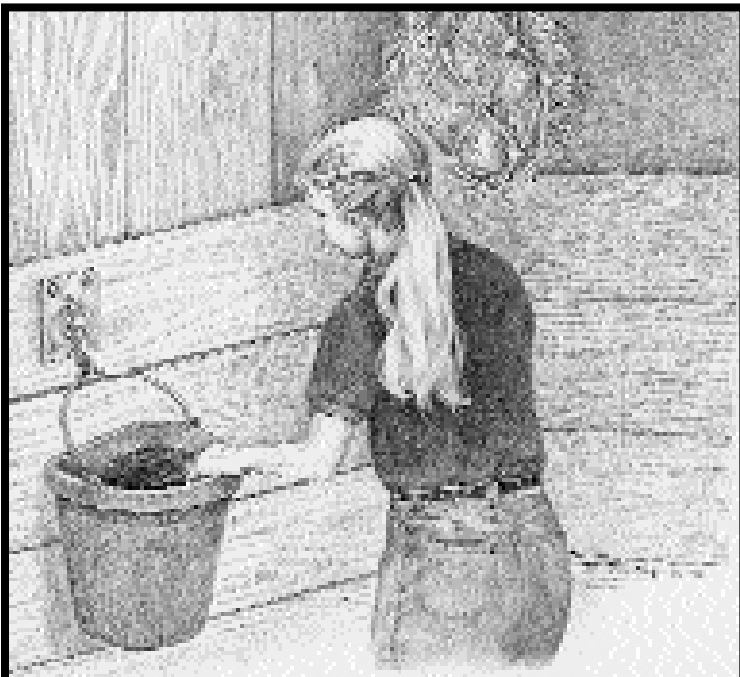
Science is an extremely important facet of veterinary medicine and animal care, but it goes hand in hand with the powers of observation. You cannot treat an ailment that you fail to recognize. For example, consider what happens when you feed your horses. While running through the stable to hustle through your nightly chores, how much time do you spend looking at your horses and

their surroundings? Do you really pay attention to them? Many horse owners would maintain that they pay attention to such details, but if their assertions were true, why have I evaluated so many colic cases in horses with full feed buckets hanging nearby? The horses obviously lost interest in eating due to the developing colic. If they did not eat all their dinner, that fact often went unnoticed until the next morning at feeding time.

Pay attention not only to your horse's eating habits, but its living habits as well. If your horse normally is tidy in his stall and you notice signs that he has pawed or rolled, this could indicate the onset of colic.

OBSERVE

- General environment.
- Condition of the stall/bedding.
- State of feed/water conditions.
- State of pasture/paddock.
- New environments.
- Condition of other animals on property.



Be alert to changes while performing routine chores.

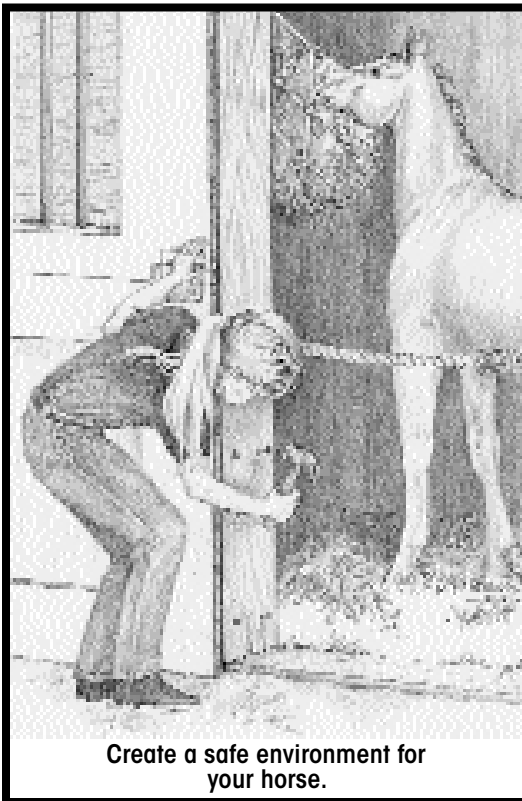
Changes in the consistency of manure also can signal a problem. It is very important to familiarize yourself with the quirks, personality, habits, and routine behavior of each of your horses. As you may know, horses are as individual as the people who care for them. Some horses might only give extremely subtle signs of serious health problems. Like people, some horses have a very high tolerance to pain, while others completely fall apart at the slightest twinge. Sometimes, very subtle changes in behavior can be the first sign of a medical problem. If you work on your powers of observation, you could be able to head off many such problems.

For example, the mellowing of a typically high-strung or aggressive horse can be a sign of depression related to fever or to some degree of pain. A typically calm mare who starts to act a bit stallion-like could be suffering from

an ovarian tumor. Several neurological diseases can produce behavioral changes.

I once gave a lecture to a group of animal science students and asked, "What do you do while you water the horses?" A student in the front replied, "I check out the horses, of course!" Well, I countered, "Are you really sure you pay attention?" Her reply (with a touch of 'what's his problem?' in her voice): "Yes!"

So I asked the following: Would you notice if the horse was pointing with



Create a safe environment for your horse.

one of its feet? Would you notice if the horse was shifting weight back and forth more than normal? Would you notice if there was a laceration on the side of the animal not facing you? Would you notice if there was a circular track worn in the bedding? Would you notice how many piles of manure are in the stall? Would you notice if there was a small amount of feed coming from the nostril not facing you? Would you notice if one of the animal's joints was slightly swollen?

In addition, I presented evidence that noticing any one of these subtle signs tonight could make a difference in the overall outcome if they were related to certain disease processes or injuries. The students ultimately acknowledged that maybe they didn't pay as much attention to the horses as they thought they did.

I am mentioning these sorts of things in a book on first aid because the earlier a problem is noticed and confronted, the more positive the outcome could be. This is not true in all situations, but it can reinforce the sense you are doing all you can to correct the problem. Pay attention and be alert.

CHAPTER 2

Knowing Normal from Abnormal

For horse owners and others who care for horses, recognizing the differences between what is normal and what is abnormal about them forms the basic foundation for good animal husbandry and veterinary medicine. Using your powers of observation can be very important for the early recognition of subtle abnormalities.

One of my favorite stories concerned an elderly physician who entered an examination room to see a patient. After a congenial introduction, handshake, and general question on “how do you feel,” the physician proceeded to sit down and write a page and a half of physical examination findings before continuing to evaluate the patient. The surprised patient asked the doctor to explain what he based his initial findings on, since he had not touched him. The physician said he noted such things as body posture, “nature” of the eyes, and manner of speaking — right down to observing that the patient was a smoker by the nicotine stains on his fingers.

I liked that story when I first heard it. It made sense. So from that day on I attempted to improve my powers of observation, both as a veterinarian and as a horseperson. In addition, I used the story to urge my students, clients,

and others who spend time with horses to observe them closely, to get more in touch with the animals.

Once your powers of observation have alerted you to a potential problem, it is time to obtain some more objective information about the situation. The best place to start is with a simple physical examination. I believe that all horse owners or caretakers should be able to perform a basic physical examination.

Providing this kind of basic information can be very helpful to the veterinarian when you call to describe a horse's injury or other health problem. When you first call your veterinarian about a problem, providing basic information is often a great help in prioritizing the emergency. For example, if your horse has a cut and has bled a seemingly substantial amount, you may panic, but if the horse's heart and respiratory rates are low, the level of emergency might not be as high as the panic provoked by the sight of all that blood. On the other hand, if that same horse has a heart rate over 120 beats per minute and its gums are pale, the level of emergency is significantly higher.

A physical examination of a horse should be approached in a methodical manner and include both a "hands-off" observation and a "hands-on" evaluation. After you read over the basic methodology for doing a physical examination, I'm sure your favorite horse will be a willing and patient subject on which to practice. Be sure to save the notes you make during the examination. Later, if the horse is ill or injured, you and your veterinarian can compare its condition against the examination made while the horse was healthy.

Although taking many of the basic measurements are straightforward and easy to do, it would be useful for you to follow up with a demonstration, or lesson, from your veterinarian in order to fine-tune the process. Such a demonstration will give you a good opportunity to ask

your veterinarian what specific information you should gather before calling for help in an emergency.

VITAL SIGNS

The physical examination should assess any changes in the horse's demeanor, respiratory system, cardiovascular system, body temperature, evidence of shock, and hydration status.

For a moment, usually from a distance and outside the stall, I like simply to observe the horse. Is the horse abnormally anxious or depressed? Is the horse exhibiting signs of pain such as flank watching, pawing, or stretching? Is there evidence that the horse has gotten down and rolled? Is there bedding on its coat or in its mane and tail? If so, make a note about the abnormal posture or activity. Such changes in the general demeanor of a horse can be significant.

Don't just evaluate the horse — evaluate its environment, too. Is there evidence that the horse has been drinking and eating? How many piles of manure have been



Taking the horse's temperature.

produced today and what is the consistency? Obviously, if the horse is violently thrashing in pain or if it is bleeding severely, you do not want to spend an hour collecting this sort of information before you call in the veterinarian. But if this examination process becomes part of your daily routine, you'll be able to note the changes in the horse's condition in a matter of minutes.

To establish a baseline set of measurements when the horse is healthy, do your "hands-off" observations first. Then after watching the horse, measure its heart and re-

spiratory rates. I usually insert a livestock thermometer into the horse's rectum and wait the appropriate time (three minutes) before removing and reading it. During the "thermometer time," you can perform most of the other parts of your examination. Remember that if the horse is difficult about the thermometer, and a fight ensues, its heart rate can increase. Let the horse relax for a minute or two before rechecking the heart rate, or check it after the thermometer is removed.

The use of a stethoscope can make it easier to determine the heart and respiratory rates, but is not essential. The heart rate can be determined by feeling for the pulse along the lingual artery. It can be felt under the jaw, where it lies just under the skin and on the bone. I once heard a 4-H leader describe it as feeling for something like a thick piece of spaghetti. The pulse, or heart rate, also can be as-



essed by listening to the heart at the point of the elbow on the left side with a stethoscope. The normal heart rate for a horse is approximately 30 to 40 beats per minute.

The respiratory rate can be determined by watching the rib cage, feeling for the breaths at the nostrils, or listening to the breaths in the windpipe

with a stethoscope. At the same time that the respiratory rate is determined, the character of the horse's breathing should be noted. Are the horse's nostrils flared when it inhales? Is there air moving through both nostrils? Is there any noise being generated as the horse breathes? The normal respiratory rate for a horse is eight to 12 breaths per minute.

After determining the heart rate and respiratory rate, assess the color, moistness, and capillary refill of the gums. Normally, a healthy horse has gums that are pink and moist. It should have a capillary refill time of about two seconds. The capillary refill time is determined by pressing hard on the gum line next to the teeth and determining how long it takes for the blood you squeezed out to rush back into the area, making the blanched white spot you created go away. Gums that are abnormal in color (bright red, dark red, bluish, or white) and a capillary refill time greater than two seconds can be an indication of various forms of shock.

Don't forget about the thermometer reading. A horse's normal body temperature varies between 99.5 and 101.5 degrees Fahrenheit.

These physical parameters and how different disease processes or injury affect them will be discussed in subsequent chapters.

I emphasize that each horse responds to physical problems differently. For example, not all horses experiencing pain have an elevated heart rate.

Sometimes when you look over your horse, "alarm bells" will go off simply because you know your horse so well. That's the time to pull out the notes you first made as a baseline when your horse was healthy and compare them to the horse's vital signs taken when you suspect there might be a problem. Such notes will provide you and your veterinarian with a useful guide in assessing a potential problem.

CHAPTER 3

Being Prepared for Emergencies

The best way to prepare for emergencies is to try to prevent them. Perhaps the best approach to first aid is to minimize the risk of accidents, injuries, and disease. Sometimes we do foolish things with, and to, our horses. It's a wonder they don't have more disasters.

I once turned out a yearling in a paddock that another horse owner had used for many of his horses. I just assumed it must be safe for mine. Was that assumption lazy? Stupid? Costly? Yes! The yearling ran straight to the center of the field, pawed twice at an exposed drainage pipe, and severely lacerated a leg on the sharp edges of the pipe.

In my practice, I often see horses with lacerated eyelids and nostrils. Such injuries come from the nails you didn't check for before you put your horses in their stalls at the show grounds.

What's the point? Always be aware of your horse's surroundings. The game is to find out how your horse can get injured before it actually happens. Leave no stone unturned and no danger undiscovered around your barn, paddocks, and horse trailer. Make a habit of routinely checking everything, then remove or repair anything that looks dangerous.

Prior to an actual emergency, it is a good idea to discuss with your veterinarian the horse-related emergency situations described in this book. Every vet has his or her own preferences for handling such emergencies. Also make provisions for contacting a second veterinarian if yours is unavailable when an emergency occurs.

If your horse has a severe injury or illness and needs to be transported to a referral center, or hospital, you should know where you are going and how you are going to get the horse there. Two a.m. is not the time to organize transportation! I can think of numerous situations where the transport of horses requiring critical care was delayed significantly (sometimes fatally) due to poor planning.

If you do not have a horse trailer, you should inquire about local commercial transportation or the use of a friend's trailer. Again, you should always have several backup transportation options ready, even if you have your own truck and trailer (they seem to break down when you least expect it).

Another aspect of preparing for emergencies is knowing where you are going before you need to make the trip. I can think of times when hopelessly lost drivers hauled their severely ill or injured horses several extra miles, unnecessarily prolonging those difficult trips. Find out from your veterinarian where he or she would send your horse should a referral be necessary, then plan the route ahead of time. Mark it on a map and add detailed driving directions. Keep all the appropriate phone numbers for your veterinarian and the referral veterinarian or clinic with the map.

BEING PREPARED

- A first aid kit should contain material for bandaging, splinting, and general wound cleaning.
- A second first aid kit should be assembled for travel.
- Use a first aid kit only for emergencies.
- Make sure your trailer is in working order.

THE ESSENTIAL FIRST AID KIT

The preparation of a horse first aid kit for your stable is easy to make and — in an emergency — can be of great importance. Once you have assembled such a kit, make sure everyone knows this golden rule: its contents are for emergency use only. When things are used, they must be restocked immediately. When you have to apply a pressure bandage to a profusely bleeding wound, it is not a good time to discover that someone took the last elastic bandage out of the kit and used it for a non-emergency: to protect the horse's neatly braided tail!

The most basic of first aid kits should include material for bandaging, splinting, and general wound cleansing. A variety of bandaging material should be in the kit, including some sterile pads to place over wounds after they have been cleansed (large non-stick Telfa pads work well, as do the kind of disposable diapers that come in plastic packages).

For most of the bandages applied to lacerations or under splints, you will need an ample supply of wrapping material. It is a good idea to put an entire “bundle” of clean sheet cotton and at least five packages of rolled cotton in the kit. There are a variety of commercially available elastic support bandages that can be used to apply pressure.

Occasionally, you can find large bundles of military surplus “field bandages” at an Army-Navy surplus store. They work well for a variety of equine bandaging needs. Add adhesive tape, both the medical cloth variety as well as duct tape, and small scissors to cut it. We will discuss bandaging and splinting techniques in detail in the next chapter.

In addition to bandaging material, the kit should include alcohol prep pads, sterile four-inch gauze pads, or sterile sponges for cleansing wounds. A syringe (without the needle) can be used to flush sterile water into the wound.

You can keep your first aid supplies in a sturdy container with a lid. Be sure to put in a flashlight with strong, fresh batteries, a bottle of clean, sterile or distilled water, latex gloves, a clean towel, and a twitch you can use single-handed.

Pick out a humane twitch. The best kind to get is made of tubing hinged at the center so that it may be closed over the horse's lip, then held closed by wrapping a cotton tie around the two handles and clipping the swivel snap to the horse's halter ring. Such a device will quiet down the horse and will leave your hands free to cope with the emergency.

It is a good idea to consult with your regular veterinarian about assembling a first aid kit. Many horse owners ask me what drugs they should keep on hand for emergencies. It is my personal opinion that any drugs kept on hand should be used only on the advice of a veterinarian and only used after significant instruction. Depending on the circumstances, the indiscriminate use of pain medications such as phenylbutazone, Banamine, or any of the antibiotics can have severely negative consequences.

A second version of the stable first aid kit should be assembled for you to take on the road. The cellular phone is obviously a great tool when in need of emergency assistance or directions. It's become almost a necessity when traveling with horses. I also like to make sure I have flares or reflectors.

Before each trip, I make sure that the trailer is in order. It is best to double check the hitching mechanisms, lights, turn signals, floor, doors, and tires. Be sure to carry a spare tire, tire iron, and jacks for both the truck and trailer. Make sure that there are a significant number of lights or reflectors on the back of the trailer. More on emergency transportation later.

CHAPTER 4

The Musculoskeletal System and Wounds

SEVERE ACUTE LAMENESS

Severe acute lameness can be caused by something as simple as a foot abscess (actually, it's the most common cause of lameness) or by something as devastating as a fracture. Until the cause is determined, the horse should be moved as little as possible to avoid further trauma if the lameness involves a fracture or tendon injury.

Following are some causes of lameness:

FOOT PUNCTURES/ABSCESES

If a single foot is warm and there is sensitivity around the coronary band and/or an increased "pulse" in the foot, the likely cause is a foot abscess. Check the bottom surface of each foot for any foreign objects. When you discover a nail or other foreign object stuck in a foot, do not remove it. If the nail head or foreign object protrudes from the sole of the foot, I know you'll be tempted to try to pull it out. Don't.

Wait for the veterinarian to evaluate the puncture wound and the best way to remove the foreign object. The reason for leaving the object in the foot is that, depending on the location of the puncture, your veterinarian will most likely want to take a radiograph to determine what foot struc-

tures are involved. For example, in a radiograph of a horse's foot, an imbedded nail will show up very clearly while dye injected into an empty nail hole might not extend all the way into the deepest part of the wound. The veterinarian will get the best picture of the problem if the foreign object is still in the foot.

While you wait for the vet to arrive, you can build a platform shoe for the horse by taping some small wooden blocks onto the base of the hoof around the object. This can prevent a foreign object from getting driven deeper into the foot if the horse steps on it.

Or you can use bolt cutters to cut the object off close to the foot to prevent it from going in further. But, again, it should not be removed. The specific location and depth of the puncture can greatly affect the initial treatment plan and the prognosis.

SIGNS OF MUSCULOSKELETAL PAIN

- Pointing.
- Treading.
- Reluctance to move.
- Tail thrashing.
- Decreased stride length.
- Overt lameness.
- Increased heart rate.
- Increased respiratory rate.
- Sweating.
- Lying down frequently.

LAMINITIS (FOUNDER)

The word “founder” means “to sink to the ground” and refers to what can happen in the aftermath of an episode of laminitis. The coffin bone actually can become detached from the hoof wall and “sink” toward the ground. Laminitis is a disease process that occurs within the hoof wall where the non-sensitive, finger-nail-type tissue attaches to the sensitive living tissue (and subsequently to the coffin bone). As you should now know, the suffix “itis” means inflammation, and the disease laminitis is an



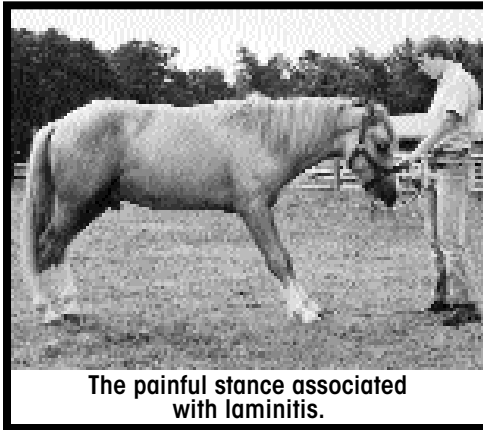
Checking for an elevated pulse.

inflammation of the “laminae” or the anatomical area described above. The disease is most common in the front feet, but can affect the hind feet or all four feet. The pony breeds always have been known for their increased susceptibility to laminitis, but the disease can strike any horse.

Laminitis can be related to a number of specific risk factors, with overeating of grain being perhaps the most well-known. In fact, the over-ingestion of carbohydrates, such as grain, could so predictably reproduce the disease it was the ac-

cepted scientific method for creating laminitis for research purposes. In addition to overeating of grain, the sudden ingestion of lush pasture (“grass founder”), the ingestion of large amounts of cold water (“water founder”), and the severe concussion of working on a hard surface (“road founder”) can increase the risk of laminitis. Other risk factors include the development of a uterine infection related to a retained placenta, infection with the causative organism of Potomac horse fever, infection with salmonella, the presence of a pituitary tumor, and a variety of other systemic illnesses.

It always is prudent to ensure that all grain products are secure from those midnight escape artists and that introduction to a fresh lush spring pasture is done gradually. If your horse is experiencing any of the other mentioned risk factors, early recognition and treatment could help to reduce the chances of him developing severe, uncontrollable laminitis.



The clinical signs generally are typical. If both front feet are sore and the horse postures with its front feet slightly out in front of it and moves as if “walking on eggshells,” laminitis is a possible cause.

Other signs that might be present are warm feet, an increased pulse in the artery on the pastern area, reluctance to stand on one foot, and sensitivity to pressure placed on the front surface of the hoof wall (i.e., with hoof-testers).

If you suspect that your horse is suffering from laminitis, the horse should not be made to walk or fed any grain. In addition, the stall should be bedded deeply to provide support for the feet. Veterinary evaluation should be sought as soon as laminitis is suspected as the sooner the diagnosis is confirmed and appropriate treatment started, the better the chances of controlling it. Acute laminitis should always be considered an emergency.

TENDONITIS (BOWED TENDON)

The hallmarks of inflammation are heat, pain, and swelling. Areas of inflammation might indicate an area surrounding a fracture, but also might be associated with a large degree of soft tissue damage. The flexor tendons and the suspensory ligament on the back of the lower leg should be evaluated carefully for enlargement or bowing and other signs of inflammation associated with tendonitis (remember, the suffix “itis” infers inflammation).

Call in your veterinarian if the lameness can be isolated to the flexor tendons or suspensory ligament. Veterinary



A bowed tendon.

evaluation is very important with tendon and ligament injuries because putting the horse back to work too soon or starting an inappropriate exercise program can greatly increase the risk of re-injury.

In the time immediately following the injury, a good first treatment is cold therapy. If the horse will stand in a tub or in a clean muck bucket, soaking the injured leg in water and ice works well. If you have Hydro-boots, or any other commercial cooling items, they work well, too. Spraying cold water on the horse's leg with a garden hose is a trusty, fail-safe method of applying cold therapy.

One important thing to remember is that the application of cold can be overdone. Applying cold water will de-

crease inflammation, mainly by constricting blood vessels, and will decrease circulation to the damaged area. However, when the area is kept cold for too long, the blood vessels will dilate and the beneficial effects can be lost. Generally, veterinarians recommend applying cold for 20 to 30 minutes and then taking a break for one to two hours before starting another cold therapy session.

Between the times for the cold therapy, the injured portion of the leg can be placed under a thick, well-applied support wrap. I do not have much faith in many of the commercial cooling gels, liniments, and similar products, but a non-heating poultice can be applied safely to the injured area. Remember not to apply heat to an acute soft tissue injury. The application of heat to an acute injury can worsen the degree of tissue damage. Use heat therapy only during the healing phase of an injury (gen-

erally at least three days after the injury) and only under the advisement of your veterinarian.

FRACTURES

If a fracture is obvious (because the leg is dangling or is in an abnormal position relative to the body) the horse should not be moved until the leg is properly splinted and bandaged. A large, thick bandage, often called a Robert Jones bandage, can be applied the full length of the limb. Before applying the bandage, check for any breaks in the skin. They should be noted and cleansed with an iodine scrub and covered with a sterile pad.

Typically, four or five full rolls of roll cotton are applied to the leg (in a pinch, a pillow could be used) and then the cotton is covered with four or five rolls of elastic bandages. When Ace bandages or Vetrap are wrapped too tightly, they can cut off circulation. The beauty of the Robert Jones bandage is that the pillow or thick rolls of cotton provide a forgiving padding that makes it hard to get the elastic bandages on too tight.

If splint material is going to be added, it can be held in place over the Robert Jones bandage with duct tape or other strong tape. Such tape should also be added at the very top and bottom of a Robert Jones bandage because you don't want the bandage to twist, or apply torsion to the injury.

A variety of materials can serve as a worthy splint, such as PVC piping cutouts, cut off pitch fork handles, or even a short piece of wood cut from 2 x 4 inch lumber. It is desirable to splint the leg from two right angle sides: the front and the outside. Remember, the main goal here is to stabilize the limb as well as possible and keep the horse calm until the veterinarian arrives.

The horse should not be moved until it is thoroughly evaluated by a veterinarian if the lameness appears to be a severe, non-weight bearing lameness affecting a hind

limb, especially if the onset is associated with a fall. Foot abscesses and puncture wounds are also possibilities for the hind limbs. If there is any chance of a pelvic fracture, the movement of the sharp, fractured bones can lacerate an artery, which can result in the horse bleeding to death.

WOUNDS AND LACERATIONS

One of the most important facts regarding severe wounds is that the sooner they are noticed and repaired the better the patient's prognosis, both functionally and cosmetically. Another aspect of wounds is that they bleed, some significantly more than others. Blood loss will be considered in a separate chapter in this book, but will be discussed here in the context of wounds.

Good horse management and wound management begins with a routine vaccination program for protection from tetanus. The once-dreaded disease, also called lockjaw, still claims many horses' lives each year. It is caused by the toxin from *Clostridium tetani*, which produces an endless spasm of the muscles in the jaw followed by severe contractions in all other muscles. It ends in a horrible death. Such an end is easily preventable.

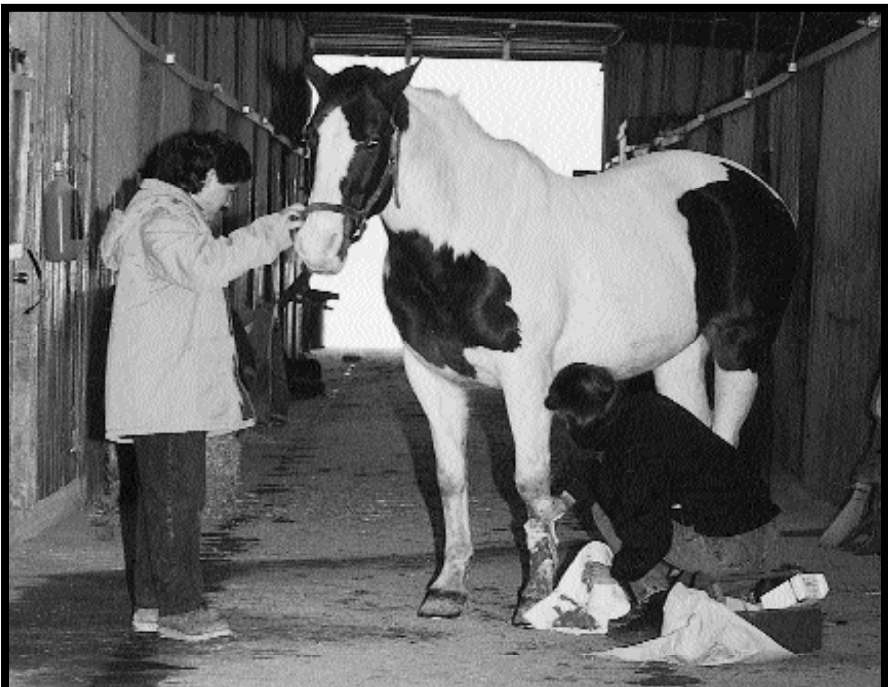
Healthy horses should receive a first vaccination when they are weaned. It should be followed by annual booster shots of tetanus toxoid. If a wound might have become contaminated with soil, or if the immunization record for the wounded horse is unknown, the veterinarian will probably inject the horse with tetanus anti-toxin to give it a short-term measure of protection lasting a week or two. Vaccination records should be well-documented in writing and easily accessible for all of your horses. While your veterinarian keeps such records, you should also keep a set of records that travel with the horse.

A fresh limb wound that is bleeding profusely will need a pressure bandage applied as soon as possible. Try to stay calm. A relatively small, and non-life threatening

quantity of blood can look like a much greater quantity than it really is. The bandage serves to apply pressure on the hemorrhaging blood vessels and helps to promote blood clotting.

If a large artery is severed, it will be difficult to apply enough pressure, especially if the laceration is any place other than the lower limb, but an attempt to apply a pressure bandage should still be made. The bandage should not be too thick, as this will limit the ability to apply an adequate degree of pressure for bleeding control. Using any one of the following wrappings will work: three sheets of sheet cotton, a quilted shipping bandage, a bath towel appropriately folded, or several layers of roll cotton. Hold the pressure bandage in place with several rolls of an elastic bandage material.

The elastic bandage material should be applied in a smooth, even, and firm manner — there must be adequate pressure if it is to be effective at controlling hemorrhage.



Wounds and lacerations should receive prompt attention.

This kind of bandage might be too tight for long periods of time, but it can be used at first to staunch the flow of blood. The bandage can be left in place for 20 to 30 minutes, at which time it can be replaced with less blood-soaked material. Or if the bleeding has subsided, it can be replaced with a clean and more loosely applied support bandage.

If the laceration involves the flexor tendons or suspensory ligament, an effort should be made to provide more significant support and immobilization. A Robert Jones bandage and splinting should be applied to the leg while waiting for the veterinarian or before transporting the horse to a veterinary clinic. This sort of support and immobilization can help prevent further damage if the horse attempts to put its weight down on the injured leg. The horse should be moved as little as possible until its injury has been evaluated and repairs have been made.

If the wound is older, bleeding might have subsided or have slowed substantially, but in such a case there might be significant contamination by dirt, debris, and bacteria. With respect to wound repair, there is what is known as a “golden period.” The golden period is considered to be the first six hours after the wound was created. If the wound is appropriately cleansed and repaired during this time frame, the chances of complications from infection are reduced. Therefore, it is important to have wounds evaluated and repaired as soon as possible. To decrease the amount of contamination and reduce the risk of complications, cleanse the wound with warm water while waiting for the veterinarian and paint the area with an iodine-based surgical scrub.

In addition to cleansing, the application of a sterile dressing and support bandage can be of great benefit, especially if the horse cannot be seen by a veterinarian right away. If the wound is very old (noted by dried-out skin edges or the presence of pus) and has a great degree of

swelling and inflammation associated with it, the use of cold hydrotherapy can be helpful. Use a garden hose to spray cold water on the wound site and swollen tissues. Cold hydrotherapy can reduce some of the inflammation and aid in the clean-up process until a veterinarian can debride the wound properly.

COMPLICATIONS FROM VACCINATIONS

Sometimes a horse has a reaction following a vaccination. The local and whole body reaction to a number of the equine immunization products is a well-known side effect of these necessary shots. Some horses demonstrate signs of systemic illness, such as depression, inappetence, and fever.

Localized inflammatory reactions (heat, pain, and swelling) usually arise within two to three days of vaccination. A common misconception is that such reactions result from a “dirty needle” or “poor injection technique.” These reactions are usually the result of the vaccine causing a reaction in the muscle tissue surrounding the injection site. If the injection site becomes abscessed, it might need to be lanced and allowed to drain, but initially it should be hot packed. The application of heat can be extremely beneficial when trying to “mature” an abscess, or area of infection, in an effort to reduce the swelling and promote drainage. However, as with cold therapy, a heat treatment can be overdone. One of my favorite ways to apply heat is to place a wad of cotton in a zip-lock baggie, adding water that is just hot enough to allow you to hold the bag without it being unbearable. Hold the baggie hot pack against the abscessed area for 20 to 30 minutes. Repeat the heat treatment several times per day, ringing out and re-heating the cotton as necessary. Electric heating pads should not be used as they can easily burn the skin if the temperature is not monitored carefully. Of course, the good old hot water bottle works well, too. Your veterinarian

ian should be consulted before using anti-inflammatory drugs such as phenylbutazone or applying topical anti-inflammatories such as DMSO.

Again, do not forget to evaluate the horse's current level of tetanus protection with any wound (including a vaccine

reaction on the chance that it could become infected).

Tetanus is a mostly preventable disease. Statistics indicate that 50% of the horses that contract tetanus die from it. Therefore, in my opinion, a horse owner or care giver would be negligent if he or she failed to provide such protection.

SIGNS OF "TYING-UP"

- Reluctance to walk/move forward.
- Increased heart rate.
- Sweating.
- Increased firmness of muscles.
- Production of brown/red colored urine.

TYING-UP

The scientific term for tying-up is rhabdomyolysis. The suffix "rhabdo" means muscle and the root word "myolysis" refers to the "lysis" or breakdown of muscle tissue. Tying-up also has been called Monday morning disease because in the era of work horses, people noticed a greater number of such cases occurred on Mondays, after the horses had a day of rest on Sunday. To this day, there is a greater chance for some horses, usually Thoroughbred racehorses, to develop the problem when trained on Monday morning following their day off. There is an association with high carbohydrate diets (grain) and the development of this problem in some horses along with the lack of consistent exercise. For horses used in endurance rides or three-day events, the problem can occur during or on the day after the competition.

The signs of a horse which has tied up, in the early stages, might be a simple reluctance to walk. So, now that you are improving your powers of observation, you should stop and evaluate your horse instead of just dragging it forward, assuming it's just being stubborn. It might

seem excessively sweaty and have an elevated heart rate relative to its stage of cooling out. (Such observations are a new use for your physical examination skills.) Feel the large mass of muscles behind the horse's shoulder (the triceps) and in its rump (the gluteals). If the horse is tying up, they might be firm or even hard. Remember that you need to know what these muscles normally feel like so you can make the the comparison. In extreme cases, the muscles actually can appear to bulge somewhat. In severe cases, the horse's urine will become discolored, appearing to be a dark reddish brown.

Tying-up is an emergency that requires a veterinarian's attention. Depending on the degree of severity, the horse might require intravenous fluids and drug therapy.

Some people mistakenly believe that it is a good idea to try and walk a horse that is tying-up. Once I arrived just in time to prevent a client from wielding a whip to force his horse to walk on. In the acute states of this disease, a horse should not be made to walk. The horse's muscles are damaged and the more you make a damaged muscle work the more it is damaged — it really is that simple.

Another remedy that has been used indiscriminately is giving a diuretic drug called furosemide, or Lasix. If it is given in the early stages, Lasix will serve only to further dehydrate an already dehydrated horse. The use of any drugs should be reserved for the discretion of your veterinarian. The horse should be placed in a deeply bedded stall and kept as quiet as possible. If the horse is sufficiently cooled out, it should be allowed to drink small quantities of water (about a liter at a time) every 15 minutes.

CHAPTER 5

Problems of the Gastrointestinal System

Problems with the gastrointestinal tract are among the most common maladies affecting the horse. The word colic is used as a catch-all term for abdominal distress. In Greek, colic means “affecting the bowels.”

Fortunately many cases of colic are mild and pass without extensive treatment or surgery. However, in other cases, the horse’s condition can deteriorate rapidly. Time can be of the essence in such cases if advance treatment or surgery is to be successful.

Many cases of colic occur for unknown reasons, but certainly there is some association with alteration of horse management practices. Sudden changes in feeding

habits should be avoided. Many colics occur when horses are suddenly switched from one type of feed to another. For example, from a lesser quality grass hay to high quality alfalfa or from grass to concentrates (grain).

The digestive system of a horse involves a fermentation process that actually has a



Tail flagging could indicate abdominal pain.

very delicate balance. Anything that alters this delicate balance has the potential to increase gas and/or acid production and might predispose the horse to gastrointestinal problems.

Any changes in feeding habits (including new access to a lush, rich pasture) should be made gradually. When changing types of hay, make sure to get the new hay before the old hay is completely used up. When feeding, gradually add the new to the old. To reduce the chances of colic, when the horse travels, it might be wise to take along food to which it is accustomed.

Water, in addition to being vital for life, is very important for the health of the gastrointestinal system. Water is actually the most important nutrient. A complete lack of water will kill long before a lack of any other nutrient. There seems to be an increased risk of impaction colic during the cold winter months, which might be associated with a decreased water intake. It has been shown experimentally that during the winter months, offering horses water heated to room temperature can as much as double their water intake. Horses should always have access to fresh, clean water (from clean buckets and tanks).

SIGNS OF COLIC

- Sudden inappetence.
- Pawing/striking.
- Kicking at belly.
- Looking at flank.
- Tail flagging/swishing.
- Rolling/thrashing.
- Lip curling.
- Persistent stretching.

SEVERE ABDOMINAL PAIN

Many signs are associated with abdominal pain. The most obvious ones include: looking at the belly (flank watching), pawing incessantly, kicking at the belly, and rolling. Other signs of abdominal pain consist of lip curling, inappetence, stretching or posturing to urinate,

depression, and flipping or “flagging” of the tail. These latter signs are less specifically associated with abdominal pain and might be caused by other problems.

When a horse demonstrates signs of colic, or abdominal pain, a veterinarian should be consulted fairly soon.



This foal is demonstrating pain...

Many cases of colic are mild and can be related to excess gas in the intestines, but more serious causes can be difficult for a lay person to distinguish due to the variability of signs. If the signs reflect a serious problem, time is extremely important if advanced treatment, or surgery is necessary.



...and rolling — a sign of colic.

If the horse is rolling violently, it is best to make it get up. Keep it walking in an open area. The horse should not be allowed to eat until a veterinarian has evaluated the horse and recommended a course of treatment.

GRAIN OVERLOAD (OVEREATING)

Have you ever noticed that there is always one escape artist in every barn full of horses? Grain overload often results when a horse or pony escapes from its stall and hits the jackpot, raiding the feed bin by eating a 100-pound bag of sweetfeed. Another

common problem results from excessive quantities of grain or corn (an overload) going to one horse in a group of pastured horses. Usually the herd leader, the alpha horse, can keep the others at bay and eat more than its share.

The two major problems associated with grain overload are the development of laminitis and rupture of the stomach. If you are suspicious of grain overload get veterinary assistance as soon as possible. Horses cannot vomit, so if there is an indigestion causing a buildup of fluid and gas in the stomach, the expanding gases and collecting fluids can rupture the stomach. A horse with a ruptured stomach cannot be saved. To prevent a rupture, your veterinarian will insert a nasogastric tube that acts as an exhaust pipe to relieve the gas buildup and siphon off the fluid.

Even if the horse does not seem to be in pain, prompt veterinary attention is still very important so that appropriate therapy can be started. The therapies are aimed at reducing the risk of laminitis and gastrointestinal distress. Obviously, the horse should not be allowed to eat while waiting for evaluation.

INGESTION OF TOXINS

There are many plants and toxic substances that affect horses, but three stand out as being worthy of mentioning here. The Japanese yew is extremely toxic to horses — a few mouthfuls can kill a horse. The only first aid for Japanese yew poisoning is to make every effort to ensure that your horse will never see this plant.

TOXIC PLANTS, SUB- STANCES

- Japanese yew.
- Red maple leaves.
- Monensin or lasalosid poisoning.

The wilted leaves of the red maple tree also can be ex-

tremely toxic to horses. Be aware of this and make an effort to keep the two from meeting.

Should you have suspicion of red maple ingestion, veterinary care should be obtained as soon as possible.

The third toxin worth noting is monensin or lasalosid poisoning. These substances are common additives to cattle feed and as little as a few kilograms can be fatally toxic to horses. There is no treatment. As a general rule, horses should never have access to cattle feed.

WOUNDS TO THE ABDOMEN

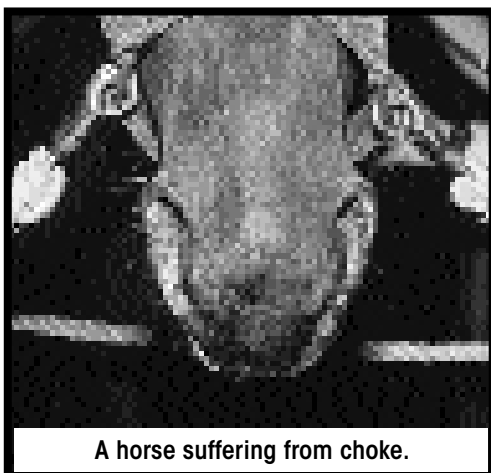
Any wound to the abdominal area should be assumed to have penetrated into the abdomen until proven otherwise. If the abdomen has been penetrated, the risk of developing peritonitis (inflammation of the abdominal cavity) is great and the earlier this is treated the better the prognosis. In a worst-case scenario, if the intestine has actually been punctured or lacerated, the horse usually develops elevated respiratory and heart rates and shows significant signs of shock soon after the contents of the intestines leak into the abdominal cavity.

If the wound is a large laceration and a piece of intestine is protruding, the horse must be kept still and the bowel supported. Veterinary assistance should be sought immediately. The bowel can be supported with a clean bed sheet wrapped around the belly and fixed over the back of the horse. If possible, avoid touching the bowel and make every attempt to prevent it from contacting the ground.

A rare complication of castration is the herniation of the intestine through the castration incision. Should this occur, the bowel can be supported with part of the sheet being placed between the hind limbs and over the rump. Again, veterinary assistance should be sought immediately.

FOOD/WATER FROM THE NOSTRILS

If milk is coming from the nostrils in a young foal, a veterinarian should be called in. Possible causes include a cleft palate (rare) or botulism. In an adult horse, the most common cause of food or water coming from the nostrils is “choke.” Choke is an esophageal obstructive condition, commonly caused by feed materials (either hay or grain) that obstruct the esophagus, typically in the lower neck region. I have also seen choke caused by foreign objects such as a chunk of wood, a ball of twine, a solid alfalfa cube, and large clumps of beet pulp.



A horse suffering from choke.

One great predisposing factor to choke is poor dentition (bad teeth).

Most cases of choke require veterinary intervention to be relieved. The important thing is to recognize the problem. If there is suspicion of a choke situation, all feed and water should be removed from the stall — the horse should not be allowed to eat or drink anything until a veterinary evaluation has been performed. With the esophagus obstructed, there is a great chance if the horse tries to eat food or drink water it will be inhaled into the lungs instead. Aspiration pneumonia is a common complication of choke. Remember to remove all bedding material from the horse's stall so it will not attempt to eat straw or shavings when hay is unavailable.

INAPPETENCE

There are a wide variety of illnesses that can cause inappetence; it is a very nonspecific clinical sign. When faced with an animal which won't eat, you can obtain the body temperature, heart rate, and respiratory rate and note other observations. Has the horse been defecating? Is there evidence of unobserved abdominal pain, such as a messy stall or bedding on the animal?

Has the horse been drinking normally? Is there feed material in the nostrils or other nasal discharge? This information can be provided when a veterinarian is consulted.



Diarrhea can make a horse very sick.

ACUTE DIARRHEA

Diarrhea in the horse can be quick in onset and progress very rapidly. Whether the cause is salmonella, Potomac horse fever, or another disease, the horse can become quite sick and extremely dehydrated in a very short period of time. It is im-

portant to note that in the early stages of enteritis (inflammation of the bowel), diarrhea might not be a prominent clinical sign. Some horses with enteritis show signs of abdominal pain and develop “toxic” mucous membranes (dark or bright red with a prolonged capillary refill time) along with signs of severe dehydration before they actually develop diarrhea.

The important thing is to recognize the signs of a horse in trouble and seek veterinary assistance. If it has diarrhea and is still drinking, make sure there is an ample supply of fresh clean water.

In addition, you'll need to help the horse replenish the

electrolytes (sodium chloride, potassium, and bicarbonate) that it lost due to diarrhea. Simply add a ready-made powdered electrolyte mix to a bucket of water. Or prepare an electrolyte mixture using the following household chemicals: add 1 ounce of sodium chloride (table salt), 1 ounce of sodium bicarbonate (baking soda), and 2 ounces of potassium chloride (Morton Lyte salt) to five gallons of water. Remember, if your horse develops diarrhea or other signs associated with the development of diarrhea, call the veterinarian first. Some of the causes of diarrhea have very specific treatments and it's in your horse's best interest to get an accurate diagnosis and treatment.

Also, keep in mind that at least one cause of diarrhea, salmonella, is contagious. So, a horse with diarrhea should be isolated from the other horses in your herd. Its water bucket and feed tub should not be used for any other animal. If possible, one person should be designated to care for that horse. Strict hygiene procedures (hand washing, wearing of rubber boots, isolated removal of the contaminated bedding) should be implemented.

CHAPTER 6

The Respiratory System

The early recognition of a respiratory disease is very important because early detection and treatment can prevent a respiratory crisis. For example, three days before the scheduled date to transport a mare from New



A yearling with strangles.

York to the West Coast, she developed a slight cloudy nasal discharge. At that time there was nothing else obviously wrong with the mare — she had a good appetite and seemed bright, alert, and active. Further evaluation revealed a mild fever. When I squeezed her trachea (windpipe) in the mid- to upper-part of her neck, she coughed. At that time I decided to delay shipping her. If the original nasal discharge had not precipitated an evaluation, the mare might have been shipped, putting her at risk of greatly

worsening her respiratory problem.

Respiratory conditions related to transportation are common. The whole group of ailments is often labeled “shipping fever.” It is very important to pay close attention to your horse’s health prior to shipping.

If the horse shows any signs of a respiratory infection (fever, cough, increased respiratory rate, or significant nasal discharge) it should not be transported until a veterinarian has evaluated it. In addition to putting your horse at risk, shipping it with some contagious respiratory condition, such as strangles (*Streptococcus equi*) or a viral infection, can put other horses at risk if they share the trip or the stabling of the ill horse.

SIGNS OF RESPIRATORY DISTRESS

- Increased respiratory rate.
- Flaring of nostrils while breathing.
- Making a noise while breathing.
- Excessive abdominal movement while breathing.

Should your horse develop any of the aforementioned signs of respiratory diseases, further evaluation is very important. It also is important to allow the horse to rest until the veterinary examination has been made.

Exercising a horse with a respiratory disease can greatly increase the chances of a relatively mild problem developing into something more serious.

INCREASED RESPIRATORY RATE

An increased respiratory rate is one of the signs of infectious respiratory disease, but it can be caused by other things, too. If the horse has been exercising, is it cooling out properly? One of the major ways horses dissipate heat is through sweating. After vigorous exercise, if a horse is not sweating, or is having trouble cooling out, then the increased respiratory rate might indicate heat stress. Heat stress and other problems will be discussed in a later chapter.

An increased respiratory rate can indicate severe anemia — are the horse's mucous membranes pale? If so, your veterinarian will want to take a blood sample.

Another cause of an increased respiratory rate can be

an allergic response. Has there been exposure to red maple leaves? Has the horse just been given any medications or vaccinations? Is there any evidence that the animal may have been bitten by insects or a snake? These sorts of reactions can be mild or the beginning of a full blown anaphylactic reaction that requires immediate veterinary attention (more on anaphylaxis later).

SEVERE HEAVES (COPD) CRISIS

The problem commonly called heaves can cause a respiratory crisis associated with chronic obstructive pulmonary disease (COPD). Such a crisis is an emergency situation.



A horse suffering from COPD (heaves).

Should you own or care for a horse which has been diagnosed with heaves, great care should be taken to avoid such a crisis. A management and exercise program for the horse should be devised with the help of your veterinarian. It should be strictly followed.

What causes COPD?

Common allergens associated with the disease are several molds and hay dust, but numerous others have been incriminated in individual cases. The cause varies from horse to horse. For example, I once cared for a horse that was stabled indoors for most of the summer. The animal's heaves got worse whenever it was put out on pasture. Its pasture was next to a field of mixed grass hay and weeds that was allowed to flower and go to seed before it was bush-hogged. About 24 hours after the field was mowed, the horse went through an extreme respiratory crisis that required days of stabling and drug treatment to control.

The crisis might have been avoided if the horse had been removed from the area just before the field was bush-hogged. If the farmer had mowed more frequently (so that grass and weeds never flowered), his horse might not have gone into a COPD crisis.

Horses experiencing a heaves crisis have extreme difficulty in moving air. The condition is similar to a human having an asthma crisis. The horse's respiratory rate becomes elevated as it flares its nostrils, and tries to move air in and out. As it tries to breathe, especially on expiration, there is a significant amount of movement along its flanks and abdomen. This is called abdominal breathing. Sometimes horses with heaves have to work so hard at breathing that they will not be able to eat or drink. Veterinary care is generally required, since drug therapy is necessary to control the problem.

CAUSES OF RESPIRATORY DISTRESS

- Viral infection such as strangles.
- Shipping fever.
- Heaves.
- Guttural pouch infection.
- Upper airway obstruction.
- Wounds in the thoracic cavity.

UPPER AIRWAY OBSTRUCTION

Obstruction of the upper airway can be a life-threatening problem that must have veterinary evaluation as soon as possible. If the obstruction is related to swelling and inflammation of the throat, the cause can be an abscess that compresses the airway. Abscesses can be a result of a puncture wound, but more commonly are associated with abscessed lymph nodes related to strangles. Typically, there are some external signs of swelling in the throat area along with other clinical signs such as depression, nasal discharge, and the presence of fever. Veterinary evaluation should be sought immediately if the horse is

roaring, a distinctive noise made by the labored breathing of a horse with airway obstruction.

Once the airway becomes narrow enough to make noise, the turbulence of airflow can irritate the tissue, causing swelling and further narrowing. This type of airway obstruction quickly might require an emergency tracheostomy (cutting a hole in the trachea in the middle of the neck), so getting veterinary help quickly is important.

Airway obstruction can occur quite rapidly. If the airway obstruction is associated with swelling around the muzzle, from insect bites (bee, wasp, spider, red ant) or a snake bite, and the horse is having extreme difficulty breathing, you may have to assist it while waiting for the veterinarian to arrive. If such an emergency occurs, cut an eight- to 12-inch length of garden hose. Lubricate it with petroleum jelly and gently insert it into one of the obstructed nostrils. Use duct tape to secure the hose segment to the horse's halter. Although it will be hard to do, you should try to keep the horse as calm as possible.

This emergency measure is not intended to place the tube into the horse's throat or trachea. A longer tube should not be used. You do not want to traumatize the larynx. This technique will only provide relief if the swelling is restricted to the muzzle and outer nasal passage area. Swelling from these causes can rapidly progress, and emergency veterinary care should be sought even if the nostril tube improves the animal's breathing.

WOUNDS IN THE THORACIC CAVITY

Any wound in the chest or between the front legs in the pectoral area should be considered to have entered the chest cavity until proven otherwise. A wound entering the chest has the following consequences: first, the thoracic cavity will be contaminated and infection is likely; second, the lung can collapse (pneumothorax) and imme-

diate respiratory distress will follow. If you hear “sucking” noises from the chest wound, it should be covered with a clean dressing and secured with an elastic bandage (wrapped completely around the horse’s body). Hopefully, the bandage will apply enough pressure to seal the wound. If a foreign object is stuck in the horse, it should be left in place (wrapped or secured with a bandage if necessary) until the veterinarian arrives. The horse should be kept as calm and still as possible.

It’s hard to know how deep such wounds go. In the muscular chest area, even small wounds can reach the thoracic cavity and slowly leak, causing a delayed pneumothorax. Even if the horse is acting normally and the wound appears minor, carefully monitor it for the development of an increased respiratory rate. The horse should be kept standing in its stall until your veterinarian can evaluate the injury.

CHAPTER 7

The Nervous System

ACUTE ATAXIA (INCOORDINATION)

Barely perceptible abnormalities usually precede acute ataxia, or incoordination. An ataxic horse will appear to stagger forward, or sideways, or backwards! It cannot coordinate its voluntary muscular movements. A serious injury to the brain stem or spinal cord and some nervous disorders cause ataxia. Causes for spinal cord or brain



A horse with EPM, showing muscle atrophy in the hindquarters.

abnormalities that produce ataxia include severe head trauma, spinal cord injuries, equine protozoal myeloencephalitis (EPM), equine degenerative myelopathy (EDM), and equine “wobbler” syndrome

Sometimes the first sign occurs when a horse falls down under unusual circumstances — for example, falling while walking across the familiar ground of its own paddock. Signs of ataxia also might follow a bad fall over a steep-lechase fence, for example. If the horse looks ataxic after the fall in the paddock, you’ll wonder which came first: the fall which could create an injury that causes the ataxia, or the ataxia that might have caused the fall.

NERVOUS SYSTEM DISORDERS

- Head, spinal injuries/trauma.
- EPM.
- EDM.
- Wobbler syndrome.
- Seizures.
- Mania or bizarre behavior.

Development of incoordination following a fall, or a fight with another horse, might be related to the swelling around a fractured vertebrae in the neck. Any horse suspected of having a neck fracture should be confined in a small box stall and kept as calm as possible until a thorough veterinary evaluation can be performed. Do not get trapped in the stall with an ataxic horse. In its confusion or inability to control body movement, it might whirl around and fall on you. If it will be some time until the veterinarian arrives, rig up a hay bag and hang water and feed buckets above waist level so your horse will not have to flex its head and neck to eat and drink.

HEAD INJURIES

Skull fractures can occur with falls. Typically, skull fractures are associated with trauma after falling, flipping over backwards, rearing up into a stall door (or trailer

ceiling), and hitting the poll or top of the head. Injuries from these types of accidents do not have a good prognosis. Therefore, prevention is even more important than first aid. Skull fractures occur most often when young horses begin training. Great care should be taken when teaching young horses to lunge, to accept side reins, to stand while cross tied, and to work on long lines.

Remember, in most training situations, the more you pull, restrain, or fight a horse, the more the horse will resist, increasing the chances of this sort of serious injury. If the horse pulls, give a little, and move with it. In addition, cross ties should have quick-release snaps on the end or be made of a material that will break. I always advise against the use of nylon halters. Nylon is a tough material and will not break easily if a horse is in a fight with it. Usually, leads and halters made of leather and cotton rope leads will break before something on the horse does.

Just as a human baby has a soft spot on the top of its skull, an immature horse's skull has areas of development called "suture lines." These soft spots joining the bones of the skull together are areas predisposed to fracture. One of these suture lines sits right under of the brain and is a common site in cases of head trauma. When a fracture occurs there, significant brain damage also can occur.

After such trauma, typical signs are severe depression, loss of consciousness, seizures, or ataxia (incoordination) when the animal moves. In addition, there might be hemorrhaging from the ear canals and/or nostrils. In such cases, veterinary attention should be sought immediately.

SEIZURES

One of the most important things to remember when faced with a horse having seizures is that there is very little you can do. A horse having seizures is extremely dangerous to be around. If the horse is in a stall, you

should not attempt to enter to aid it. A 1,200-pound horse having a seizure can do great bodily harm to itself — and to you! Keep its stall dark and quiet. Call for veterinary assistance immediately. Fortunately, seizures in the adult horse are rare. Causes can be related to trauma, infection, and vascular compromise. Horses can suffer from a form of epilepsy that causes seizures.

Seizures in foals can be related to the above-mentioned causes, but are more commonly associated with hypoglycemia (low blood sugar) or neonatal septicemia (complete systemic infection). One of the first signs in a sick foal might be its decreased milk intake related to its depression and weakened state.

An important point here, to be discussed in more detail in the neonatal section of this book, is that a foal's health can be very fragile and veterinary evaluation should be sought early if you suspect any abnormality. If a foal is seizing because of hypoglycemia, it indicates an extremely low blood sugar and should be considered a veterinary emergency.

While waiting for the veterinarian to arrive, load a large syringe with 15 to 30 ml (cc) of Karo corn syrup. Place it in the foal's mouth and gradually coat its tongue with the syrup. Take the foal's temperature. If it is abnormally low (below 99.0 degrees Fahrenheit), use blankets and hot water bottles to raise the foal's body temperature. Prolonged seizures can raise the body temperature, so it is important to obtain the temperature reading prior to applying any warmth and continue to monitor it.

MANIA OR BIZARRE BEHAVIOR

Extreme changes in the personality of a horse can be a strong indication of a medical problem. For example, when a mare develops stallion-like behavior, it might indicate an ovarian tumor that is producing male sex hormones.

On a more ominous note, severe changes in personality can be an indication of viral encephalitis and rabies. In school, I learned that the only thing predictable about the clinical signs of rabies is that they are unpredictable. However, there has been one early-warning symptom present in every rabies cases I've seen: an obvious change in the horse's personality was noticed first before other symptoms.

One horse developed a very aggressive personality. Although the horse normally had a very placid demeanor, when it became rabid its personality changed. It was out in a paddock and would not let anyone in. The horse would charge you with a look of rage. In any case in which rabies is suspected, veterinary evaluation should be obtained immediately. There should be no other human contact with the horse until a diagnosis has been made.

Annual rabies vaccinations for all of your pets and horses should be considered in areas where rabies has been reported in the wildlife population.

WEAKNESS



Generalized weakness can be a clinical sign of numerous ailments. If the weakness is acute and profound in nature, botulism can cause it.

Botulism, or acute food poisoning, is caused by toxins produced by bacterium called *Clostridium botulinum*. The bacterium can contaminate feed

products (typically the cause of botulism in adult horses). In foals, generalized weakness often accompanies an active infection (often associated with an umbilical infection).

The signs associated with this type of neuromuscular weakness are whole body muscle tremors, generalized weakness, and the inability to swallow.

The horse has difficulty in rising and it might only be able to stand briefly before collapsing. Muscle tremors in foals have led to the term “shaker” foal. In addition, such foals often have milk running from their nostrils after nursing due to their inability to swallow. When foals cannot nurse effectively, hypoglycemia occurs and can be an additional life-threatening factor. Any of these signs in a foal should be considered a veterinary emergency.

CHAPTER 8

Blood Loss (Hemorrhage)

FACTS ABOUT BLOOD

Blood is an essential component of the mechanism whereby oxygen is transferred from the lungs to all of the body's organs and tissues. So just how much blood does a horse have anyway? It varies some from breed to breed,



Significant blood loss can lead to shock.

but an average value is 80 ml (cc) per kilogram of body weight (100 ml/kg for “hot bloods” such as the Thoroughbred and 65 ml/kg for “cold bloods” such as a Pecheron). So, the average 1,200-pound horse (545.5 kilograms at 2.2 kilograms per pound) has about 54.5 liters of blood, which is approximately 12.3 gallons of blood.

Now that we know that the average horse has about 12 gallons of blood, how much can be lost before the danger of shock becomes significant? The general rule of thumb is

that an animal will start to show signs of shock from blood loss when 10% of its blood volume has been lost. Based on the averages, the adult 1,200-pound horse can lose up to two gallons of blood before serious concern. Most bleeding from wounds appears much more copious than it actually is, but any time there is hemorrhage there should be an attempt to control it.

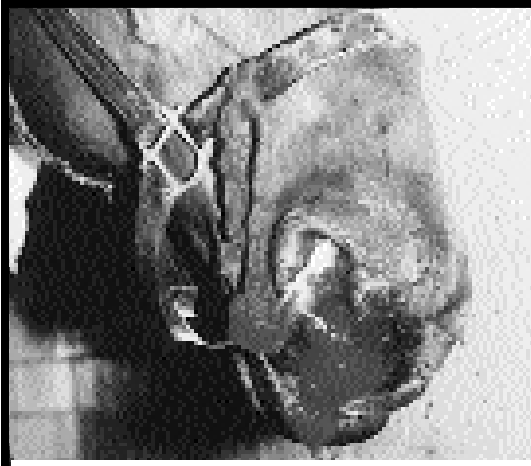
The use of pressure bandages and their application already has been discussed, but will be briefly reviewed here. Remember that the first aid kit should contain leg wrap material and elastic bandage material. If the wrap is too thick, it will decrease the ability to apply an adequate amount of pressure to control the bleeding effectively. The bandage should be applied in a tight, smooth manner and in such a way as to apply significant pressure directly over the wound (if possible). The signs of blood loss shock include weakness, whole body sweating, colic, progressively elevated heart rate, and pale/white mucous membranes.

POST-CASTRATION HEMORRHAGE

A potential complication of castration is significant hemorrhage from the surgical site. Depending on the surgical technique used, the degree of normal post-surgical bleeding can vary. Your veterinarian should discuss with you how much bleeding to expect and when to become concerned. If a drop of blood every few seconds becomes a strong steady stream or a pulsing squirt, concern is warranted. On rare occasions, the bleeding can occur internally. The signs of internal hemorrhage are colic, significantly increased heart rate, and pale/white mucous membranes. Horses experiencing these signs post-castration should be evaluated by a veterinarian.

FROM EARS, NOSE, OR MOUTH

As previously mentioned, the presence of blood in the



Significant bleeding from the nostril.

ear canal after trauma can indicate a skull fracture. Additional clinical signs might include severe depression, seizing, and/or holding the head in a tilted manner. These animal should be evaluated by a veterinarian as soon as possible. Bleeding from the nose also can be considered a veterinary emergency, especially if

the hemorrhage is coming from one nostril and is not associated with exercise. Bleeding from the nose (usually both nostrils) during strenuous exercise can be a result of exercise-induced pulmonary hemorrhage (EIPH).

Exercise-induced pulmonary hemorrhage is common in racehorses and is actually a bleeding within the lungs, which is manifested as bleeding from the nostril in severe cases. If a horse bleeds as described after exercise, the horse should have this diagnosis confirmed (and other causes ruled out) by a veterinarian using endoscopy.

Another cause of bleeding from the nose (usually one nostril) is called guttural pouch mycosis. The guttural pouch is a structure in the horse's head (very few other mammals have this structure) that opens/drains into the nasal cavity. A number of



Less severe bleeding.

very vital structures travel within the guttural pouch, one being the internal carotid artery. Mycosis refers to a fungal infection — guttural pouch mycosis is a fungal infection within the guttural pouch. As the infection advances, it can erode the internal carotid artery and, if left untreated, eventually lead to a severe and typically fatal hemorrhage.

It is because of this disease that hemorrhage from the nose should be taken very seriously, even though it is possible for a laceration, foreign body, tumor, or other cause to be responsible for the bleeding. The treatment for guttural pouch mycosis generally involves surgery. A horse experiencing hemorrhaging from the nose should be kept as calm as possible and be evaluated by a veterinarian as soon as possible.

Another potential cause for bleeding from the nostril is a type of tumor called an ethmoid hematoma. This diagnosis can be distinguished from guttural pouch mycosis with endoscopy. Ethmoid hematomas tend to have a much better prognosis than guttural pouch mycosis.

BLEEDING FROM THE RECTUM

Blood coming from the rectum can represent an extremely serious veterinary medical emergency. If a relatively healthy horse is observed to be bleeding from the rectum, the most likely cause is some type of trauma. I have seen this result from malicious insertion of an object into the horse's rectum and from a stallion raping another horse.

These situations need to be evaluated as soon as possible due to the potential for tearing of the rectum deep enough to allow fecal contamination of the abdominal cavity. Should this occur, the prognosis is grave. If there is a tear and the abdomen has not yet been contaminated, immediate attention is required to evaluate the injury and perform reparative measures.

If the bleeding is a result of thermometer insertion or breaking inside the rectum, it is not usually deep enough in the rectum to cause abdominal contamination, but still should be carefully monitored or evaluated due to the potential for perirectal (around the rectum) abscess formation. A thermometer should be well-lubricated and never forced into the rectum.

In addition, rectal bleeding can be observed occasionally in horses which are very sick and suffering from a blood coagulation abnormality called DIC; these horses usually have evidence of hemorrhage from multiple sites and have a grave prognosis.

BLEEDING OF THE UTERINE ARTERY



There are two large arteries that supply the uterus with blood. One crisis that can occur is severe hemorrhage of one of these arteries into the surrounding tissue or abdominal cavity. This problem, "rupture of the uterine artery," is well-documented in older mares and usually occurs after the birth of the foal or up to a few days afterward. It is suspected that during the birth process the artery ruptures or is torn in varying degrees. The arteries travel in a band of tissue called the broad ligament which helps to suspend the uterus within

the abdominal cavity.

If the rupture is small, a hematoma will form within the broad ligament and, hopefully, the ligament will

contain the bleeding and the pressure will slow the hemorrhage and allow the artery to clot. If the rupture is large and the blood flow strong, the hematoma can become quite large (basketball-sized) and potentially start to bleed freely into the abdominal cavity. If the hematoma is small, the only clinical sign might be mild colic during the post-partum period and, obviously, if the other extreme occurs the mare could bleed to death in a relatively short period of time.

Signs of more significant hemorrhage would include weakness, significantly elevated heart rate, continued colic, and pale/white mucous membranes. Many mares will experience post-partum cramping and demonstrate some degree of colic, but veterinary evaluation should be performed nonetheless. Mares suspected of uterine artery hemorrhage should be kept as calm as possible and moved as little as possible (cross-tie if necessary). Excessive movement or excitement could hinder blood clot formation.

CHAPTER 9

Metabolic Emergencies

Metabolism can be defined as the physical and chemical processes that living things carry on to maintain life. A metabolic emergency generally refers to a disruption of the horse's metabolism related to tissue oxygen deprivation, hydration status (body water content), and alterations in blood electrolyte levels (electrolytes are the trace minerals and salts, including sodium, chloride, potassium, and calcium).

Metabolic action is divided into two categories: aerobic and anaerobic. In the aerobic state, the body's cells use energy sources (such as glucose) in the presence of oxygen (i.e., it is carried in the blood). Anaerobic refers to metabolic actions where the energy sources are used in the absence of oxygen.

Anaerobic conditions exist in many tissues during numerous disease processes in which the overall blood flow is reduced. During exercise, if the exercise is intense and beyond the anaerobic threshold, the oxygen supplied to the tissues by the blood is simply less than the oxygen demand of the tissues.

So why is this supply and demand issue important? First, anaerobic metabolism is not as energy efficient as aerobic. For every molecule of the energy source used (glucose), there is considerably less overall energy pro-

duced. Second, when a tissue is operating under anaerobic metabolism, there is an acid by-product (lactic acid) that builds up in the tissues. It can have a negative impact on the metabolism and overall performance, health, and well-being of the animal.

EXERCISE EXHAUSTION

The ability to exercise and the metabolic responses to exercise differ in each individual horse and can vary greatly depending on many factors. The genetic potential for athleticism, the level of training, the degree of conditioning, the presence of underlying health problems, and environmental variables such as ambient temperature and humidity are only a few of the factors that determine overall exercise tolerance. As many a “weekend warrior-type” human athlete knows all too well, if you have trained to run a couple of miles once a week and then set out to do the 26-mile Boston Marathon, the outcome will be painful. The same is true for your horse.

Many exercise-induced problems could be avoided by applying common sense limits to performance stresses. If you plan to compete at eventing and endurance riding, make sure both you and your horse are appropriately prepared. Know your limits and don’t be afraid to pull up if those limits are going to be exceeded. During the training for such events, monitoring of the health and well being of your horse becomes your responsibility. Seek out advice on training. Learn what the danger signs are and gradually expand your horse’s individual limits.

Exercise exhaustion can occur after relatively brief maximal exercise or after prolonged submaximal exercise. The signs of exercise exhaustion are: 1) a persistently elevated body temperature, heart rate, and respiratory rate; 2) the presence of dehydration with a lack of thirst; 3) an increased capillary refill time observed in the gums; 4) an irregular heart rhythm; 5) decreased gastrointestinal sounds, a flabby dilated anus, and colic; 6) muscle cramps and spasms; 7) depression and

lack of desire to eat; and 8) the presence of “thumps” (described later in this chapter).

Many events and endurance trail rides are carefully monitored by veterinarians to make sure that competing horses are not exercised beyond their limits. A prescribed rest period is mandatory during which time the horses 1) rest, and 2) are carefully monitored for signs of exhaustion. The horses' heart rate, respiratory rate, and rectal temperatures are determined, then monitored to see if they decrease appropriately during the rest period. Typically, the heart rate should become less than 60 beats per minute and the respiratory rate less than 40 breaths per minute within 20 to 30 minutes after the start of the rest period.

If the heart rate and respiratory rate do not decrease during the rest period or if the horse has an excessively high rectal temperature (typically in excess of 105.0 degrees F) then the horse will be held for a longer time or be excused from the competition because those signs are indications of exhaustion. The rider should not continue to exercise the horse. During this time, the event veterinarian will evaluate the horse's way of going for signs of lameness or rhabdomyolysis.

Should the horse develop exercise exhaustion or any musculoskeletal abnormalities, prompt veterinary attention can be very important. The horse might be dehydrated and might need, in addition to intravenous fluids, correction of its blood electrolyte levels. If possible, it is best to get help to come to you or to make provisions to trailer the troubled horse to assistance as soon as possible. Further exercise of a metabolically stressed horse can have grave consequences. If medical help or trailering are not available, the rider should allow the horse to rest. While it is not a good idea to offer an overheated horse unlimited water, it is a good idea to offer it a small amount of electrolyte-laced water or to place electrolyte paste on its tongue. Standing the horse in a stream or splashing cool water on its legs will help to reduce its core temperature, slow its respiration and, perhaps, lower



A severe laceration near the coronary band (above); a severe laceration over the hock (below, left) and the application of a "stack" wrap to aid in the immobilization of the laceration.





A “de-gloving” injury (left), resulting from electric fence wire; (below) a severe laceration in which the cannon bone is exposed.



This horse (top right) has a broken right foreleg; (below left), this horse cannot bear weight on the right foreleg, suggesting an elbow fracture or nerve paralysis; a splint has been applied (below right) to the broken limb.





The application of a support bandage.



...and the completion of a support bandage.



Material needed for a splint;
the first steps in applying a splint.



Completing the application
of a splint.



A healthy gum (left), as indicated by the pink color; (below) the bright red mucous membranes of a horse experiencing severe toxic shock due to an obstructed portion of the intestine.



its pulse.

This kind of metabolic emergency can be described as exhaustive disease syndrome. It often involves the following complications: severe dehydration, synchronous diaphragmatic flutter (the “thumps”), and hyperthermia.

SEVERE DEHYDRATION

Dehydration can be a significant problem for the performance horse as well as for horses suffering from other disease processes. If you suspect dehydration, you can check easily your horse's hydration status if you have used one or more of the following methods to establish a baseline before the event. Although the tests are somewhat subjective, they can be valuable.

The most common test performed is the so-called “skin-tent test.” It is based on the premise that as the skin becomes dehydrated it loses its elasticity. In a dehydrated horse, if the skin is pulled up, or tented, it will snap back to the pre-pinch position more slowly than it normally does. It should be performed in an area that has some degree of consistent tension such as the point of the shoulder. Generally, the skin should snap back to normal in a few seconds. One note: older horses tend to lose the natural elasticity to the skin and it can take longer for their skin to return to place. If you know what is normal for your horse, and perform the test consistently, it can be a useful test of hydration status.

In addition to the skin-tent test, it is desirable to note the degree of moistness of the mucous membranes of the mouth. Dry or tacky mucous membranes are also an indication of dehydration. Pressing on the horse's pink gums and estimating the time it takes for the color at the pressure point to change from white back to pink is also a measure of dehydration. It, too, must be done as a comparison. Also, if the horse's eyes appear to be sunken into their sockets and have lost the luster of the outer surface of the cornea,

significant dehydration is probable. Depression and an elevated heart rate are additional, although non-specific, signs of dehydration.

Endurance and event horses can lose a substantial amount of body water (as well as electrolytes) as they sweat. It has been shown that a three-day event horse can lose up to 20 liters (5 gallons) of water during the cross-country phase of an event. It is important to make an effort to prevent dehydration from occurring.

Performance horses can become even mildly to moderately dehydrated before exercising. If the horse does not drink well on the trailer or does not like the new water at the competition site, then its water intake might be considerably reduced — and dehydration started prior to the first drop it sweats.

If you have a horse who is finicky about its water, you might need to try a number of creative (although inconvenient) water-enticing strategies. Every poor drinker is different. Some I've dealt with required bottled supermarket water, while others needed the water from home (brought along in 30 gallon plastic drums). Some horses preferred water with salt added while others accepted the unfamiliar water with oil of peppermint or with a variety of Kool-Aid (unsweetend) flavors added to it. On the subject of salt, it has been shown that the feeding of an electrolyte supplement will not increase the horse's average daily water intake, but many horses will more readily drink water that has had an electrolyte powder added to it in preference to plain water. Care should be taken not to make the water too salty and a salt/mineral block should be available to your horses at all times.

Regardless of the cause, a severely dehydrated horse should receive prompt veterinary attention. It most likely will require intravenous fluids or the forced administration of water via a stomach tube. Many dehydrated horses also have blood-electrolyte abnormalities that require correction.

A final word on dehydration. If you live in a part of the country where keeping water a liquid during certain times of

the year is a problem, extra concern is necessary. For example, if a horse (or any other any animal) has been inadvertently deprived of water for several days (or an unknown period of time) due to frozen streams, stock tanks, or water pipes, the animal should not be allowed to drink large quantities of water all at once. It is well documented, especially in pigs, that the rapid and large consumption of water following a period of water deprivation can cause serious brain disease. Water should be offered in small quantities (1 liter at a time for a horse) every few hours until the animal has had its fill and then it can be allowed unlimited access to water.

SYNCHRONOUS DIAPHRAGMATIC FLUTTER (“THUMPS”)

Thumps is a disorder that requires some understanding of equine anatomy. One of the nerves that controls breathing (the phrenic nerve) originates in the brain and courses down the neck, inside of the chest, and feeds the large muscle used for breathing, the diaphragm. During its trip through the chest, the phrenic nerve courses right over the outer covering of the heart; it is this anatomical relationship that is responsible for synchronous diaphragmatic flutter. It looks like a mild contraction or “flutter” of the diaphragm (almost like a mild hiccup), but it is not associated with breathing. The diaphragm movement is associated with the heartbeat.

A number of different electrolyte imbalances have been shown to cause thumps. When a horse experiences an electrolyte derangement (commonly low blood calcium and/or low sodium) the electrical conductivity of the phrenic nerve is altered. The electrical activity of the heart is thought to activate or “fire” the phrenic nerve and thus send an impulse to the diaphragm. The important point to note is that if a horse is showing signs of thumps, it most likely reflects a considerable blood electrolyte derangement. Immediate veterinary attention should be sought.

HYPERTHERMIA

Hyperthermia is an abnormally increased body temperature. When a fever (in a horse) becomes 105.0 degrees F or greater, there is cause for alarm. With respect to exercise-induced hyperthermia, if the horse's rectal temperature is 105.0 degrees F or higher, it should not continue to exercise and external cooling should be attempted. One of the major mechanisms by which cooling occurs is through the evaporation of sweat from the skin's surface. This process is called evaporative cooling (when the sweat evaporates, some of the heat buildup on the horse is transferred to the surrounding air).

There can be substantial environmental influences impacting the efficiency that evaporative cooling has on reduction of body temperature. High humidity decreases the ability of the surrounding air to take on the water evaporating from the skin's surface and therefore decreases this mechanism of cooling. When competing in hot, humid weather, the rider needs to pay greater attention to the horse, watching it for signs of hyperthermia.

In preparation for the Atlanta Olympics in 1996, a great deal of research was conducted to discover the most effective and safest way to cool the hyperthermic horse rapidly. The rapid application of iced water followed by its rapid removal with a scraper, then re-application of the iced water repetitively was shown to be safe and effective. The key was the repetition. When the water is applied to the skin's surface, the heat is transferred to the water, but as the water heats it cannot absorb more heat, so its removal and re-application is crucial for most effective cooling. The addition of a small quantity of alcohol to the wash water can increase the evaporation rate and therefore shorten the cooling time.

Other cases in which hyperthermia are a concern include foals that are seizing, sick foals being transported in a trailer, and virtually any horse suffering from a disease process that causes a substantial fever. The aforementioned

cooling technique can be safely employed until veterinary attention is obtained and the primary problem can be addressed.

HYPERKALEMIC PERIODIC PARALYSIS

Hyperkalemic periodic paralysis (HYPP) is a disease in horses genetically descended from a Quarter Horse stallion named Impressive. The disease causes a defect in the muscle cells that ultimately causes a rise in blood potassium (hyperkalemic means increased blood potassium). As a result of this defect, the horse experiences periodic muscle spasms and weakness of varying degrees; symptoms can be as mild as a stiff gait and flashing of the third eyelid to a severe reaction with the horse dropping to the ground in agony, literally muscle bound by very tight and rigid muscles.

Researchers at the University of California-Davis have developed a blood test that can identify horses carrying this genetic defect. Quarter Horse breeders should not breed descendants of Impressive to each other due to this terrible legacy.

Some horses which test positive almost never experience an episode while others can have frequent and severe episodes. Predisposing factors are thought to be stress and diets high in potassium. In fact, an attack can be triggered by feeding them a potassium-rich diet. Such diets include high legume-based hay (primarily alfalfa) and concentrates heavily laden with molasses (which contains lots of potassium). Obviously, such diets should be avoided in affected horses. Should an attack occur, one treatment is to administer dextrose (sugar) intravenously. While this is not something to try yourself, oral administration of a concentrated table-sugar paste or solution can help until veterinary assistance can be obtained. If you have saved an empty paste dewormer tube, or if you have a large syringe without the needle, you can use it to place the sugar paste on the horse's tongue.

CHAPTER 10

Ocular Emergencies

The eye of the horse is simple in its structure, but it handles complex functions. What something looks like to a horse is unknown. Can the horse see color? Does it see an image in the same way humans do? Despite all of our scientific experiments, hypothesis, speculation, and interest, what exactly a horse sees and how it perceives things will, most likely, always remain a mystery.

The equine eye functions to collect and “focus” incoming light. The reflected light carries the image and transmits that focused image to the brain. The parts of the eye include the cornea, iris, aqueous chamber, pupil, lens, vitreous chamber, retina, and optic nerve. Well before an ocular emergency occurs, you should familiarize yourself with the easily visible outer structures of a horse’s eye. Observe the eye with the aid of a penlight or other light source. Evidence of pain is a clear symptom of most ocular diseases. However, sometimes it is not the first sign, so paying some attention to the eye and becoming familiar with what looks normal might help you head off some problems. For example, when the eye has a bluish-white, filmy appearance, it’s a sign of trouble!

The cornea is composed of several layers, with the transparent outer layer acting as a protective barrier and

the inner cell layer functioning to move water out of the cornea. The outer surface or epithelium only allows limited penetration of water. If the outer protective epithelium is damaged (scratched, torn, etc.) or the inner layer becomes diseased or damaged, the in-between layer will take on water and develop a bluish-white patch of edema.

The pink tissue surrounding the eye is called the conjunctiva. You should look at this tissue and learn what its normal color looks like (it should be pink). When this tissue is inflamed, it becomes red and swollen which can be an early warning sign of an eye problem.

A unique structure of the equine eye is the third eyelid. The third eyelid, or nictitans, is in the inside lower corner of the eye socket and in the normal horse generally is tucked away out of sight. When the horse blinks, the third eyelid sweeps across the eye like a small windshield wiper helping the tear film keep the cornea surface clean. There is a constant quantity of tears being secreted onto the eye. The tear film serves to lubricate and moisten the corneal surface and provides a certain degree of immune protection. Immediately behind the cornea is a fluid-filled chamber called the anterior (front) chamber. The fluid in this chamber is normally crystal clear and allows a clear view of the iris. If the fluid between the cornea and iris becomes cloudy, it is a sign of inflammation within the eye. The iris is essentially everything brown surrounding the black pupil.

Horses' eyes do not have the wide variety of colors

SIGNS OF EYE PROBLEMS, INJURIES

- Pain is an obvious symptom of ocular disease or injury and can manifest as squinting, tearing, and increased sensitivity to light.
- An eye with a bluish-white, filmy appearance indicates a problem, as do red, swollen conjunctiva.
- Eyelid lacerations should be evaluated by a veterinarian. Blunt traumas to the head also require evaluation.

found in humans' eyes, but occasionally you will come across a horse with a bluish-white iris or other variations. If you carefully examine the eyes of a healthy horse, you will see dark brown "punching bag-shaped" structures on the upper edge of the iris. They are part of the normal anatomy, but if they enlarge to obstruct the pupil they have become abnormal.

The iris is what controls the size of the pupil in response to the dimness or brightness of the ambient light. To check it, look into the horse's eyes in dim light, then shine your flashlight close to its eyes. The iris contains many small blood vessels, so trauma to the eye might make it bleed. The presence of blood is often seen as a red haze in the anterior chamber of the eye. Technically, the iris is classified as part of the uvea (pronounced U-Vee-A). Uveitis (pronounced U-Vee-itis), which is also called periodic ophthalmia or moon blindness, is an inflammation of the uvea. The iris is part of the eye that is affected by moon blindness.

The lens is a clear structure of gelatinous consistency that sits directly behind the pupil. Its function is to focus the incoming light. The cornea and lens function together in focusing light and image on the back of the eye. This image is, for interest sake, upside down and backwards, similar to how the lens of a camera obscura works. It is the brain that flips the image around so that it makes sense. The lens should be clear, so if there is a white opacity behind the pupil it is likely to be a cataract. An opacity of the lens is called a cataract.

Behind the lens is a clear, jelly-like substance called the vitreous. Finally on the very back surface of the eye is the retina. It is the retina that collects the focused image and transmits it to the brain via the optic nerve. Most of the image perceived by the right eye is processed by the left side of the brain and vice versa; the optic nerves cross over and go to opposite sides of the brain.

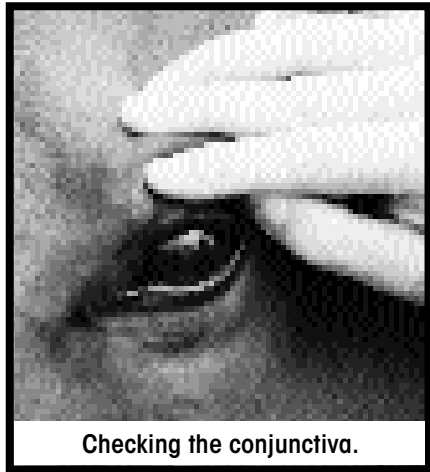
CONJUNCTIVITIS “PINKEYE”

Conjunctivitis is an inflammation of the conjunctiva (all the pink-colored tissue surrounding the eyeball). The hallmarks of this disease process are a color change of the conjunctiva from pink to red, swelling or “puffiness” of the conjunctiva, and an ocular discharge that is usually pus-like in nature. The disease can be caused by bacterial or viral infection of the ocular tissue or it can be a manifestation of another disease process. The infec-

tious cause of conjunctivitis is much more common in cats, sheep, and goats than in horses. In those species of animals, but rarely in horses, some of the causes can be contagious to humans (by direct contact).

Because the clinical signs of an acute corneal ulcer can mimic those of conjunctivitis, it is my opinion that any painful, runny, or red eye should be treated as an emergency and evaluated by a veterinarian. In addition, there are several systemic diseases (e.g., equine viral arteritis) that have ocular manifestations (conjunctivitis) early on in their course. For this reason, if any depression, fever, increase in heart rate, or inappetence occur along with conjunctivitis, the horse should be evaluated by a veterinarian. And finally, an impeded foreign body or ocular cancer can produce the same clinical signs as conjunctivitis — especially if the ocular discharge has been chronic.

Another cause for similar clinical signs is a “blocked” lacrimal duct. The tear duct in a horse starts at the inner corner of the eye and drains into the lower part of the nostril. If the duct becomes occluded (typically from some



Checking the conjunctiva.

unknown inflammatory cause), the tears will not flow properly, leading to ocular discharge and, potentially, conjunctivitis. If a blocked tear duct is the cause of the clinical signs it will need to be “flushed” by a veterinarian.

SEVERE ACUTE OCULAR PAIN

The signs of ocular pain are squinting, tearing, a pupil that appears as a pinpoint (too small for the amount of ambient light), and increased sensitivity to light. Ocular pain in the horse can be caused by many problems, but two common ones are a scratch, or a developing ulcer on the cornea, and anterior uveitis (moon blindness). Any degree of ocular pain should be considered an emergency until the underlying cause has been identified. Many eye injuries do not pose much of a threat, but some infections are characterized by an extremely rapid progression. The sooner a diagnosis is made and an appropriate treatment started the better the prognosis. It is important to seek veterinary care relatively quickly.

In many cases, the eye cannot be examined without veterinary assistance due to the pain and strong upper eyelid muscle. In most cases, the horse will need to be sedated and given an injection of local anesthetic to paralyze the upper eyelid to facilitate examination. If the eye appears to have a scratch or ulcer, it might have been caused by a foreign body, such as a splinter or thorn, that is still stuck in the conjunctiva or third eyelid. If it is and it is not removed quickly the ulcer will continue to progress. If there is a foreign body in the cornea, it also needs to be removed as quickly as possible.

The eye is not a sterile environment. Even in a healthy horse, when tissue from the conjunctiva is cultured, a great number of both bacterial and fungal organisms are present. All of them can act as a source of infection in an abrasion, scratch, or ulcer of the eye. In addition, most of the foreign bodies that commonly end up in the horse's

eye are plant materials or dirt. Both have a high contamination potential.

If the horse has developed uveitis, it is an emergency. With uveitis, the inflammation is on the inside of the eye in the anterior chamber. When inflammation occurs inside the eye, it is important to make an attempt to control it as soon as possible in an effort to decrease the risk of complications that can affect vision permanently. The treatment for uveitis is very different than that for diseases of the cornea, so it is important to get veterinary help quickly.

One extremely important thing to avoid is “borrowing” an eye ointment prescribed for another horse, or a pet, or medicine for a human. Don’t just grab the ointment and place a gob of it in the horse’s runny, painful eye. The use of an inappropriate ointment in the horse eye can have devastating consequences. Eye ointments containing corticosteroids have been shown to have an association with the development of severe fungal eye disease in horses.

For its comfort, a horse with a painful eye problem should be placed in as dark a stall as possible and should be evaluated by a veterinarian. In most cases with ulcers, the treatment should be uncomplicated, but because of certain infections which are “fast and furious” in nature (particularly *Pseudomonas* and fungal infections) an extra degree of concern for a horse with a painful eye is warranted.

EYELID LACERATIONS

Lid lacerations are often a preventable problem if a careful horse owner (or caretaker) scours a horse’s environment for any sharp objects. The next time you go to a horse show, be extra observant and check out the portable stall assigned to your horse before you put it in there. In the event that you find half of your horse’s eyelid hanging by a thread, don’t panic. Fortunately, the entire face has a good blood supply. As a result, even the most

grotesque-looking lid laceration has a fair chance of healing well if repaired promptly.

As with any wound, it is important to repair it as soon as possible to reduce the chances of complications.

No matter how small the problem appears to be, you should always have an eyelid laceration evaluated by a veterinarian due to the importance of the eyelids in protecting the eye. Even small defects in the apposition of the upper and lower lid margin could predispose the horse to future trouble. Remember that whatever caused the lid laceration could have also caused some difficult-to-detect damage to the eye itself. The eye should be thoroughly examined when the eyelid laceration is being treated.

BLUNT OCULAR TRAUMA

Any type of accident or head injury that could traumatize the eye might result in severe problems. I have seen, and treated, many injuries related to trailer incidents. Other accidents occurred when spooky horses hit their heads hard on a wall, door frame, or other solid object. Polo ponies' eyes are sometimes hit with a polo ball or mallet. Racehorses sometimes hit their heads in the starting gate. If the eye is hit bluntly but there is no apparent external damage such as a laceration, there still can be a more obscure problem. Blunt trauma can induce uveitis. If you saw the horse hit its head, you know to have a vet evaluate its eyes for any evidence of cloudiness or blood in the anterior chamber. However, even after the vet's visit, remember that the onset of this type of uveitis can be delayed and very gradual, so the eyes should be carefully monitored for several days.

Another problem that can occur with head trauma is sudden blindness. If the head trauma is hard and very sudden in the appropriate direction, the eye, which is relatively mobile in its socket, can move far enough and quickly enough to "snap" the optic nerve, causing swell-

ing and damage. This type of injury is occasionally seen in people hitting their heads on a steering wheel during an automobile accident. The importance here is that the damage is not always permanent and that rapid evaluation and administration of anti-inflammatory drugs can improve the prognosis for vision.

EYE LACERATIONS/PUNCTURES

Numerous objects as well as blunt trauma can lacerate, puncture, or rupture the eye. The prognosis for repair of these injuries is variable and depends on the degree of damage incurred and the amount of contamination or infection present. To maximize the chances of attempting a successful repair, the eye should be evaluated immediately by a veterinarian. The more time that passes, the greater the chance of infection setting in and complicating the repair attempts.

ENTROPION

The word entropion (pronounced en-trop-ion) describes the condition in which the eyelashes roll inwards and rub on the cornea. The condition is most common in newborn foals (especially those born prematurely). It causes intense irritation, ulceration, and potentially serious infection of the cornea. A foal exhibiting these symptoms should be evaluated by a veterinarian as soon as possible. This condition can easily go unnoticed, and requires careful evaluation of a newborn foal's eyes, especially if the eyes are being held closed. If you suspect the condition, do not attempt to correct it by cutting off the lashes; the cut stubble will cause even more serious corneal injury. The problem is corrected by a minor surgical procedure (a few sutures or staples adjacent to the lid).

CHAPTER 11

Neonatal Emergencies

Neonates are foals of less than two weeks of age. Emergencies involving neonates present difficult situations for horse owners and veterinarians. This chapter describes emergencies involving the foaling process and problems of the newborn foals.

CARING FOR A PREGNANT MARE

Whether you are caring for your first pregnant mare or your hundredth, it is important to keep a record of the mare's routine vaccinations and deworming, her breeding or insemination dates, ultrasound examinations, and veterinary treatments. Breeding dates are especially important to note in case there is ever a need to know the true age of the foal. If your mare has had foals in the past, it is of great value to have the records of her previous pregnancies. The mare's previous pregnancy (gestational) length(s) can be determined by carefully counting days on a calendar. For example, if the mare previously carried a foal for 350 days, then delivers at 335 days, that foal actually might be premature even though 335 days is within the normal range for equine gestation. Such records might indicate that the mare has had a foal that developed neonatal isoerythrolysis (reaction of the mare's colostrum

with the foals red blood cells, sometimes resulting in fatal anemia in the foal). Knowing about the mare's previous difficulties will give you and your veterinarian time to take precautions to prevent the same problem from occurring in the new foal.

Because the neonatal foal derives its immunity from the quality of the mare's colostrum, it is imperative to vaccinate the mare during her pregnancy. Although specific vaccination schedules are best left to your veterinarian, the basics will be described here.

At approximately one month prior to foaling, your mare should be vaccinated with a four-way shot that includes protection against tetanus, equine influenza, and Eastern/Western encephalitis (four-way indicates that the single shot carries vaccine for all four diseases).

Other vaccines that are recommended include equine rhino pneumonitis (EHV-1/4), *Clostridium botulinum* toxoid, and rabies. If your farm lies within a selenium deficient area or if drought conditions have reduced the available selenium, you also should supplement with Vitamin E and selenium during the mare's pregnancy to help prevent "white muscle disease" in the foal.

Furthermore, if your mare grazes from a pasture of mostly fescue grass, she should be removed from the pasture three to four months prior to foaling and fed good quality grass hay or alfalfa hay. Some varieties of fescue grasses are infected with a fungus (*Acremonium conenophialum*) which can lead to complications such as spontaneous abortion, agalactia (mares that do not produce colostrum or milk), prolonged pregnancies with

PREPARING FOR BIRTH

- The normal gestation period is between 320 and 365 days.
- Pregnant mares should receive vaccinations and deworming on a regular basis.
- Keep records of routine veterinary care, breeding or insemination dates, and records of previous pregnancies.

subsequent dystocia (difficult births due to the size of the foals), and thickened placentas. The fungus produces a toxin which can lead to these problems in the mares.

Routine deworming also is recommended during the mare's pregnancy and again two to three days after foaling to minimize the transmission of parasites through her milk and in the environment shared by the mare and foal. If your mare has had a Caslick's operation (sutures within the vulva), the suture line should be opened by your veterinarian two to three weeks prior to the anticipated delivery date. During the last four to six weeks of her pregnancy, the mare should be monitored daily for physical changes that indicate she is getting closer to delivering.

Physical signs of impending birth include vulvar laxity and edema (swelling), and small amounts of clear (mucus) discharge. The pelvic ligaments will relax and create a sunken appearance on either side of the tailhead. The mare's udder will enlarge and begin to produce a "waxy" yellow secretion (colostrum) as near as one to two days beforehand or sometimes as long as two weeks prior to foaling.

Normal gestation in the mare is somewhere between 320 to 365 days, with the average being 341 days. Foals born before day 300 are considered nonviable and when born between days 300 and 320 are usually considered premature. Some foals are born of "normal" gestational age but are premature in weight, appearance, and development. Such foals are called dysmature. So, if your mare has had foals in the past, it is of great value to know the length of her previous gestations.

LABOR IN THE MARE

A mare's labor can be divided into three stages. During the latter part of the pregnancy, the foal is lying on its back within the uterus, with the head toward the back end of the mare. Before the foal can be born normally, it must

flip around 180 degrees so that it is lying on its stomach with the front legs extended toward the back end of the mare. Stage I labor is the time when the foal is turning inside the uterus to get into the correct position.



During this stage of labor, the initial uterine contractions begin. The uterine



contractions help the foal to get properly positioned. While these uterine contractions are happening, the mare might act restless, getting up and down frequently, urinating often, and sweating. Owners sometimes worry when they see this kind of behavior because it signals colic,

which is a term for abdominal pain. Yes, the mare is colicky, but this is a normal part of her labor as long as she progresses to the next stage of labor.

Stage I labor can last anywhere from 20 minutes to several hours. The mare should not be disturbed during this time because she can postpone her delivery of the foal if she feels nervous



or uncomfortable. The longer the labor goes on, the harder it is on the foal. If you are planning to have your vet present for the delivery, call now.

When you see the mare's water break, stage I labor is over and stage II is beginning. You'll see a rush of straw-colored amniotic fluid coming from the mare's vagina. This happens when the foal and overlying placenta move through the cervix and the placenta breaks, releasing the fluid. The fluid will help to lubricate the mare's birth canal in preparation for the delivery. At this point, if someone is present, the mare's tail should be wrapped and her vulva cleaned with warm water and soap (liquid soap or Betadine).

Stage II of labor is characterized by active contractions which begin within a few minutes after the mare's water breaks. The mare will begin actively straining. During this stage of labor, the foal will be delivered so "time is of the essence." Keep track of the time starting when the water breaks! A mare's contractions are very forceful and her foal must be delivered within 30 to 40 minutes or it could suffocate. The mare might get up during this time once or twice, but most mares deliver their foals while lying on their side.

In a normal delivery sequence of events, first the amnion (milky white membranes) will protrude from the vulva. This is the sac that normally surrounds the foal inside the uterus. The foal should begin to emerge with its front feet, soles pointing down. The front legs are usually presented one ahead of the other. As the contractions continue, the head should become visible with the chin resting on the two front legs. After the front legs and head are visible, the mare will really begin to push, and the shoulders followed by the chest of the foal will be delivered, then the hips and hind legs.

The amnionic sac usually ruptures during the birth process. At this point, the mare should be resting and the

foal completely delivered. If the amniotic sac around the foal has not ruptured during the birth process, you should gently open the sac and remove the membranes from around the foal's nose and muzzle. If the membranes ruptured during foaling, by now the foal should be breathing comfortably. It should begin to struggle to sit up within a few minutes of birth.

If the mare and foal are both resting comfortably and quietly, they should be left undisturbed. Leaving the umbilical cord attached at this point might allow a fair amount of blood (approximately one pint) to be transferred from the placenta to the foal. The mare will break the cord when she stands.

During stage III of labor, the placenta will be passed and the mare's uterus will begin to return to normal size (involute). The placenta should be tied to itself with umbilical tape or twine to keep it from being stepped on and/or becoming entwined within the mare's hind legs. Once the placenta has been passed, remove it from the stall or paddock and place it in a clean plastic bag or bucket for your veterinarian to examine later. The veterinarian will examine the placenta to determine if all of it has been passed and also determine if there is any evidence of placentitis (infection within the placenta), which could put the foal at risk of becoming sick. The placenta is usually passed within 30 minutes of birth and should be passed within three hours of foaling.

As her uterus is involuting, the mare might show signs of mild colic. If the mare does not pass her placenta within three hours, it is called a retained placenta. This, too, is an emergency. Your veterinarian should be called immediately. The retained placenta rapidly creates infection within the uterus which can make your mare not only very sick, but can lead to severe laminitis.

Now, let's talk about abnormal deliveries and when to call your veterinarian. First and foremost, if at any time the

delivery does not appear to be proceeding as normal, or if more than 10 minutes pass with the mare straining, with no signs of front feet or the nose, notify your veterinarian immediately. Problems with the birth or difficult birth are known as a dystocia. Dystocia in the mare is an emergency situation. The most common cause of dystocia is fetal malposition. For example, instead of the foal positioned with the forelegs first and the head resting on top of the legs, the foal might be a breech birth (hind legs first) or one of the legs might be caught behind the pelvis which will prevent the foal from being delivered normally.

Other causes are due to abnormalities with the foal such as a foal with contracted tendons or twin foals. Your veterinarian will examine the position of the foal to evaluate the cause of the dystocia and correct it.

Additional causes of dystocia could be due to problems with the placenta or uterus, such as infection. If you are inexperienced with the foaling process, it is not advisable to start pulling on a body part of a foal to help with the delivery. If, for example, only one front leg is present in the birth canal and one is caught behind the pelvis, you could do serious harm to the foal and the mare by pulling on the foal when it is not in the correct position. The best treatment is always prevention and you should discuss with your veterinarian a plan for the foaling — will the vet be present or readily available. If your vet is unavailable, make sure you have a back-up.

PREMATURE SEPARATION OF THE PLACENTA (RED BAG DELIVERY)

This situation is an emergency for the foal. When the amnion begins to protrude from the vulvar lips and it is a blood red rather than milky white, you are seeing the bulge of the chorion, otherwise know as a “red bag.” It occurs when the chorioallantois detaches prematurely from the uterus. The chorioallantois normally ruptures

first as the foal moves into the birth canal and this releases the allantoic fluid. With a red bag delivery, the foal is delivered still inside the amniotic sac. This is a serious emergency. When the chorioallantois detaches there is a breach in the supply of oxygen being delivered from the uterus to the foal.

If you see this, rupture the “red bag” (chorioallantois) immediately and call in your veterinarian. It’s best to rupture the bag by gently tearing it with your fingers. Do not use knives or scalpels because you could inadvertently injure the foal. If there is premature separation of the placenta during delivery, the foal must be monitored very closely because the foal can develop problems related to hypoxia (low oxygen). Although they might appear quite normal at birth, these foals can decline rapidly after the first six to 12 hours. We do not understand the cause of red bag completely. However, fescue toxicity has been associated with this problem.

NEONATAL PROBLEMS

- Foals born at less than 320 days are considered premature.
- Foals that fail to pass their first manure within 48 hours of birth can develop colic and bloating.
- Foal rejection can range from avoidance to outright aggression. In the most severe cases, a foal must be placed with a nurse mare.

PREMATURE FOALS

Normal gestation in a mare lasts anywhere from 320 to 360 days. The average is about 341 days. A foal born at less than 320 days will display immature characteristics such as silky hair coat, overly pliable ears, weak or lax flexor tendons, and small size. Another term used to describe foals which may be of normal gestational age but are in fact immature, is dysmature. This is why records of a mare’s previous pregnancies are so important.

Foals can be born prematurely for a variety of reasons. The most common reasons for a premature delivery are infection of the placenta (placentitis) or long-standing placental insufficiency. Other causes include severe stress on the mare from illness such as pneumonia, diarrhea, or colic. Placentitis can be identified by noticing a vaginal discharge from the mare. This indicates infection of the placenta and your veterinarian should evaluate the mare immediately to begin treatment.

Premature foals are much more likely to survive than foals that are “aborted” by their very sick mothers or foals taken by Caesarean section. The foals born spontaneously often are more immature due to chronic stress. The prognosis for premature foals varies depending on the cause and the ease of the delivery.

What to do? When faced with the premature foal, your veterinarian should be called to examine the foal immediately. Some premature foals have great difficulty maintaining their body temperature, so keep the foal warm and dry. If the foal is too weak to stand and nurse, milk colostrum from the mare, if she has any, to bottle feed to the foal. Or ask your veterinarian to feed the foal colostrum via a naso-gastric tube. Save the placenta for the veterinarian to examine. It can help greatly in determining the cause of the premature delivery. A tissue sample from the placenta can be cultured to determine its bacterial components.



Many premature foals will need intensive care at a veterinary hospital for their first few days of life. The mare

and foal usually share a stall in the hospital. You can help the foal's chances by getting it veterinary attention as quickly as possible.

COLOSTRUM MANAGEMENT

At the time of its birth, the newborn foal has a functional immune system, although the foal has little or no antibodies to fight off infection. Its immune system does not have the white blood cell numbers that adults do to fight off infection and some of its disease-fighting responses are age dependent. The best and first way it gains some immunity to disease comes through the passive transfer of immunoglobulins contained in colostrum. Therefore, ingestion of colostrum, also called first milk, from the mother is imperative.

Colostrum contains immunoglobulins (antibodies) which are concentrated from the mare's blood by the mammary gland during the last two to four weeks of gestation. The secretion of colostrum is short-lived and is replaced by milk with very low levels of immunoglobulins within 12 hours from the time the foal first nurses. The foal can only absorb colostrum for a limited time. There are specialized cells which can absorb the large immunoglobulins in the small intestine of the foal. The special cells are replaced by more mature cells that line the small intestine within 24 hours. These other cells cannot absorb the colostrum immunoglobulins. That is why it is so important for foals to ingest colostrum within two hours of their birth.

Without the antibodies to fight infection, many foals develop bacterial infections that can be fatal if not treated aggressively. When foals do not absorb enough immunoglobulins, for whatever reason, it is called failure of passive transfer. The reasons for failure of passive transfer are premature lactation, weak foals which do not nurse during the first 12 hours after birth, agalactia (lack of colostrum production by the mare), or death of the mare.

Even a foal which appears to nurse well can be deficient in immunoglobulins due to poor concentration of immunoglobulins in the mare's colostrum or poor absorption by the foal.

Foals should be tested within 24 hours of birth to ensure that they have adequately absorbed the necessary immunoglobulins. This can be done by your veterinarian using one of several different blood tests. If the foal is found to be deficient before 12 hours of age, colostrum can be administered orally, or if it is not available, then oral IgG can be substituted (however, this product has been reported to have varied results). If the foal is greater than 12 hours of age, then intravenous plasma should be administered. Plasma is a blood product which is high in immunoglobulins.

A lactating mare produces about two liters of colostrum. If the mare's foal is born dead, or dies shortly after birth, her colostrum can be milked, put in a freezer, and stored for up to 18 months. Colostrum quality is variable and can be evaluated to determine the quantity of immunoglobulins present. The specific gravity is directly correlated with the amount of immunoglobulin present and can be measured with a colostometer. Measuring the colostrum in this way can determine which foals might need supplemental colostrum due to poor immunoglobulin content of the mare's colostrum. Also, the colostrum can be evaluated prior to storage.

In an emergency, when you need to thaw the frozen colostrum, it is important to remember not to thaw it in a microwave on a high setting since heat can destroy the immunoglobulins. The colostrum should be thawed at room temperature or in a hot water bath. Thawing in a microwave is acceptable if you use a very low setting.

The administration of colostrum to foals which are not nursing, to an orphaned foal, or to a rejected foal is by a bottle or through a naso-gastric tube inserted by the veter-

inarian. Foals should ingest colostrum by one to two hours of age. Foals need about one liter of colostrum divided into multiple feedings before they are eight hours old.

FAILURE TO PASS MECONIUM

The meconium or first manure passed by the foal is composed of swallowed amniotic fluid and secretions from the gastrointestinal tract. The meconium is usually dark brown to black in color and might be formed into pellets or have a paste-like or tar-like consistency. Most foals will strain to pass the meconium and it should be completely passed by 24 to 48 hours of age. Failure to pass the meconium will lead to colic (abdominal pain) and bloating. These foals also will strain to defecate. Colts appear to be more prone to meconium impactions than fillies possibly due to their small pelvis diameter.

Enemas can be administered to aid in the passage of the meconium. If you have never administered an enema to a foal, have your veterinarian instruct you. A child-size Fleet's enema, which is an over-the-counter remedy for humans, comes packaged in a soft plastic squeeze bottle topped with a narrow nozzle. It can be used to help the foal pass the meconium. Or use a homemade version that contains warm soapy water. The enema can be administered via soft flexible tubing. Lubrication of the tubing with K-Y jelly is mandatory.

If the foal continues to strain to defecate and show signs of abdominal pain, your veterinarian needs to examine the foal. More aggressive treatment with intravenous fluids and/or oral lubricates such as mineral oil might be necessary. Occasionally if the impaction is severe, surgery is warranted. Other causes of failure to pass meconium are congenital gastrointestinal abnormalities, such as failure of the gastrointestinal tract to form completely (a condition called atresia coli).

FOAL REJECTION

There are several different manifestations or degrees of foal rejection, a behavioral problem that occurs after the foal is born. To understand why foal rejection occurs and how to prevent it, you first must be able to recognize normal post-foaling maternal behavior. Normal and abnormal behavior will be described in this section on neonatal emergencies. There are some ways to prevent foal rejection. This section also will discuss how foal rejection is treated or dealt with in order to achieve more normal maternal behavior and what options exist if the mare will not accept the foal.



Normal bonding.

It is thought that a mare begins to form the bond with her foal during the early stages of labor. At the end of stage I labor, the mare's water breaks and the allantoic fluid from within her uterus is expelled. The mare usually will spend a fair amount of time smelling the fluid. After the mare gives birth, she will smell the fluids expelled with the foal, along with the placenta and might even show more interest in sniffing the fluid and placenta than the foal. The mare might show the flehmen reaction (upper lip curling) while she is smelling the fluid. This is considered normal behavior in the mare and some people think this is how the mare recognizes the foal as hers. The mare will identify the foal with the fetal fluids, because the foal will smell like the fluid, thus the mare will recognize the foal as hers.

After she has fully investigated the placenta and fluids, she will turn her attention to the foal, first smelling the foal and then she will lick the foal all over. The mare will continue to lick the foal, but only for the first few hours of life, unlike other species of animals such as cats, dogs, and cattle, who will lick their offspring off and on for several days or weeks after birth. This initial touching and smelling experience for the mare and foal is crucial for establishing a strong bond between them. The first hour of a foal's life is the most important in establishing this bond and human intervention should be limited, unless medical attention to mare or foal is necessary.

As the mother licks the foal, the foal will begin to make attempts to stand. This should occur within one hour of delivery. Foals should begin to nurse from the mare within two hours. At first, the foal will attempt to suckle everything but the mare's udder, but it eventually will find it. There is no need to interfere with this process unless the foal has not nursed from the mare within a few hours of birth. As the foal nurses, the mare can show a range of normal behaviors, even normal aggressive behavior. Mares might pin their ears, squeal, swish their tails, push the foal away, make smacking noises, and bite or kick during nursing. This is not necessarily rejection behavior. These apparently aggressive behaviors are thought to be a response to the foal bumping against the udder or biting a teat.

This type of aggressive behavior, although normal, occurs with more frequency when the foal reaches several months of age and does not occur very often with the newborn foal.

Another normal post-foaling behavior of the mare which many people erroneously consider abnormal is aggression of the mare toward humans and other horses. Even the kindest of mares can show amazing aggression toward humans after the birth of a foal. This behavior is thought

to occur as an instinct in mares because very young foals instinctively follow any large moving body. If the mare does not bond properly with the foal, the foal might begin to follow a human or if near other horses, another horse. In the wild, a foal which follows another horse would most likely starve or be attacked by a stallion.

Approach new mothers with caution and common sense. Aggression toward humans or other horses usually will subside within a week after birth. Mares recognize their own foal by a combination of vision (appearance), smell, and sound. Mares will not let a foal other than her own nurse and they use all three of these senses to positively identify their own foal and if any of these senses are obstructed (naturally or artificially) they will take longer to identify their foal from others.

Now that normal post-foaling behavior has been described, learn to recognize abnormal maternal behavior: when the mare rejects its foal. Rejection can be divided into three categories: avoidance of the foal, rejection of nursing, and actual aggression toward the foal. Avoidance usually involves first-time mothers, otherwise known as primiparous mares. It seems to be a fear-based reaction. The mare will run away from the approaching foal. Although the mare usually will not hurt the foal intentionally, she might accidentally run over or step on it if confined to a small area, such as a small box stall.

Mares which do not allow their foals to nurse present the most common maternal behavior problem, according to Katherine A. Houpt, VMD, PhD, a behavior specialist at Cornell University. This problem typically occurs with first-time mothers. Udder problems such as mastitis (also called blue bag) or a swollen, painful udder can lead to this type of behavior. Sometimes, a mare will allow a human to milk her but will not allow her foal to nurse, indicating that it is not purely a pain-based reaction. She just objects to the foal coming close enough to nurse.

The third type of abnormal behavior is aggression by the mare toward the foal. This is the least common but most serious. This abnormal behavior is characterized by the mare attacking the foal, kicking or biting it over the neck and back. The attacks usually come when the foal is standing. Attacks are sometimes precipitated by the foal nearing the mare's food. Most aggressive mares will not attack their foals while they are lying down.

The cause of this unprovoked aggression is unknown and it has been reported in many breeds. However, there is some speculation that this behavior might actually be genetic in origin. In one study, researchers found that more foal rejection occurred in Arabian mares and foals. A mare might demonstrate this rank behavior year after year with each of her foals. However, in most cases, it's a maiden mare who attacks its foal. So to some degree the behavior might be related to her inexperience as a mother. Mares which have rejected two or more foals can be expected to do the same to each additional foal.

TREATMENT OF FOAL REJECTION

Foal rejection in any form must be treated promptly to have the best chance at reversing the behavior and, most importantly, to allow the foal to ingest colostrum. If the mare will not allow the foal to nurse, colostrum should be milked from the mare and either bottle fed to the foal or administered through a naso-gastric tube by your veterinarian. If the mare is showing rejection behavior, it is imperative to call the vet.

For mares which have a fearful response to their foal, sedation might be all that is necessary for the mare to learn to accept her foal. Under veterinary supervision, the mare is sedated and the foal is allowed to approach the mare. The mare is first placed against a wall in stocks or hobbled so the chance of her hurting the foal is less and then the foal is allowed to nurse. The mare usually learns

that the foal nursing relieves the pressure of her full udder and will accept the foal.

This method also is used when a mare objects to her foal nursing. First, the mare should be examined by the veterinarian to determine if she has any problems which would be causing her pain from her udder, such as mastitis (inflammation or infection of the udder). If the mare's udder is normal, then the mare is restrained using a bar or hobbles, so that she cannot hurt the foal. The mare is sedated and then the foal is encouraged to nurse from the mare. A handler should always be present to prevent injury to the foal.

If the mare is aggressive toward her foal, she will need to be restrained at all times to prevent injury to her foal. Some methods used are cross ties, hobbles, or a bar creating a straight stall to prevent the mare from being able to kick or bite the foal. Aggressive mares are often sedated when the foal is initially introduced. Punishment and reward also are used to help the mare overcome her aggressive behavior, but only after the type of rejection is understood. Obviously, a fearful mare or mare displaying rejection due to pain should not be punished for rejection. Grain or treats can be fed to the mare while the foal is nursing. If she shows any aggression toward the foal, a whip can be used, but punishment must be given immediately and every time she shows aggression, or other behavior problems can manifest. This requires a great deal of time and effort on the owner's part, as the foal, especially in the first few days to one week of life, will need to nurse from the mare every half-hour around the clock.

Sometimes a mare will not accept her foal no matter what method is tried. The foal will need to be placed with a nurse mare or raised as an orphan.

There are a few simple rules you can follow to help decrease the chance that the mare will be unwilling to accept her foal. 1) For the first few hours after birth, keep

interruptions to a minimum to allow the mare and foal a chance to bond. Of course, if the mare or foal are not progressing along as they should, human intervention is necessary. 2) Do not re-bed the stall immediately after birth and leave the placenta in the stall for an hour or so, if possible. The placenta should always be saved, so that your veterinarian can examine it later for completeness of expulsion and for any signs of infection. 3) Avoid introducing strange horses or other unfamiliar animals to the mare's environment for the first few days after foaling. Anxiety over new animals can lead to poor bonding and possible rejection. For example, do not place a new-to-the-farm horse in the stall next to or within the paddock where your mare and foal are housed. The new horse might be carrying diseases which could make the foal sick and if the new horse and the mare do not get along, the aggression the mare feels toward the new horse might be directed at the foal.

In the majority of cases, mares deliver their foals and accept them without hesitation. However, in the unlucky few cases, rejection is a serious problem, possibly leading to foal injury, illness, or death. If your mare shows signs of rejection, please notify your veterinarian for assistance immediately. And if you are new to the management of mares and foals, it is a good idea to have experienced professionals around to help.

(Christina S. Cable, DVM, contributed to this chapter. She is a staff member in the Department of Large Animal Surgery at Cornell University.)

CHAPTER 12

Allergic Reactions

Hives are the most common allergic reaction that horses experience. Typically, the hives appear as raised welts on the skin all over the body. The causative agent of an episode of hives generally goes unknown, but the source can be a wide variety of things. Toxic, irritating compounds in a variety of plants, the stings or bites of various insects, and a variety of chemical compounds can cause hives. Ingested or inhaled substances that the animal is sensitive to can cause hives and even more severe allergic reactions.

Generally, the development of hives poses no significant danger and is not a great cause for concern (unless, of course, they are all over a conformation horse the night before a major show or if the hives cover the back right where the saddle rests). Sometimes the allergic reaction is a one-time thing that may resolve itself spontaneously without treatment. On rare occasions, hives will be the first sign of a more severe allergic reaction that will require immediate medical attention.

A horse with hives should be evaluated carefully and have its temperature, heart rate, and respiratory rate monitored. Elevated respiratory and heart rates might indicate a more severe allergic reaction, one that requires immedi-

ate veterinary care. If the horse has a full-blown anaphylactic allergic reaction, there is little first aid that can be done for it other than early recognition that it is a major emergency that requires immediate veterinary assistance as the treatment relies on specific drug therapy.

VACCINE REACTIONS

An allergic reaction to a vaccination poses a potential danger of severe, acute (and potentially fatal) problems. Have you ever wondered why your physician makes you sit in the office for those eternal 20 minutes after you get a vaccination? It is done as a precaution so you don't die from an anaphylactic reaction on the drive home. Although rare, the development of anaphylactic shock following vaccination for almost any disease process can occur and is listed as a potential complication on the package insert of most vaccine products. This problem is one to be taken seriously. If your horse is the unlucky one in a million, it most likely will die if prompt emergency treatment is not available.

For those of you who have your veterinarian perform your vaccinations, there is generally no problem as the vet can treat the problem immediately if it occurs. But, if you're in the ever-growing number of "do-it-yourselfers" who give their horses "over-the-counter" equine vaccines, in an attempt to save a little money, you could experience a horrible tragedy someday. If you are going to give your own vaccinations, at least be aware of the potential complications and consult your veterinarian first on what treatments to have on hand and what to do with them should an anaphylactic reaction occur.

LOCAL VACCINE REACTIONS

Although not technically an allergic reaction, many vaccines cause a local reaction and even cause some systemic

effects. You might have experienced a similar systemic reaction after taking your last flu shot. It is not uncommon for humans to spend a day or two of “not feeling quite right” after receiving a vaccination. Horses are no different and can become slightly depressed or develop a poor appetite for the first 24 to 72 hours after they are vaccinated. The important thing to monitor during this period is temperature. If a horse develops an abnormal temperature (up to 101 degrees), it may be caused by vaccine stimulus, but a higher temperature should be further evaluated, along with the heart rate and respiratory rate. If the vital parameters are abnormal or if the mild depression and loss of appetite continue for more than 72 hours, the horse should be seen by a veterinarian.

The development of a sore, stiff neck also is not uncommon. If a lump forms at the injection site or if the muscle around it becomes very hard, the swelling can be reduced with the application of heat. The area can be hot packed (by placing a hot towel or hot bran mash inside a zip-lock bag). The treatment should be done four to six times per day for 10 to 15 minutes each time.

Occasionally, an abscess will form at the site of vaccine injection. An abscess is often just a sterile reaction to the vaccine (with no infection present) and it might or might not burst through the skin and drain. There is also the possibility of infection being the cause of the reaction and abscess formation. Either type of abscess might require a veterinarian to “lance” the skin to facilitate drainage. If the horse is showing any signs of depression, loss of appetite, fever, or elevated heart and respiratory rates, it should be seen by a veterinarian.

Another sign of a more serious infection is the presence of air under the skin. Some types of bacteria (a particularly nasty one, in fact) produce gas that collects under the skin. You can feel this as a crackle-type feeling, sort of as if there was some of the bubble-wrap packing stuff

under their skin. If you feel such a spot at the injection site, and the horse is acting sick, it constitutes a veterinary emergency.

LOCAL ALLERGIC REACTIONS

Local allergic reactions can occur for a variety of reasons and can pose a formidable challenge in identifying the cause. If, however, it is horse fly season and your horse is out on pasture and covered with lumps, the cause is quite obvious. There is also a sandfly (*Culicoides spp*) that causes an allergic reaction in horses. Due to this little pest's favorite biting places, the common sites of swelling and irritation are the poll, mane, and tail. Many times these types of allergic reactions can be controlled by using cold therapy (cold water or ice in a zip-lock) and the local application of an over-the-counter human allergy cream, such as hydrocortisone.

Should the allergic reaction continue, with the irritation becoming severe, systemic drug therapy might be necessary to control the inflammation. A word of caution: It is sometimes easy to assume that a swelling or abnormal area of skin is being caused by an allergic reaction. There are many diseases that can also cause swelling of the legs or other areas of the body, so you must be careful not to make a faulty assumption here. If there is any change in the horse's demeanor, or appetite, or if there are abnormalities in its vital signs, veterinary consultation should be considered.



Hives from an allergic reaction.

CHAPTER 13

Emergency Transportation

Driving with a trailer full of horses is an ordinary, everyday task for most horse people. The task can become more difficult, stressful, and sometimes dangerous in an emergency situation. You should be prepared to ship a horse if it is in need of emergency care at a veterinary hospital. If you have your own trailer, make sure that it is in working order at all times (the truck, too) and always have a back-up plan. Be prepared to make the trip at a moment's notice. Get the safety equipment for the vehicle and trailer in order well in advance. Such equipment includes spare tires and jacks for both.

Remember that a cell phone can be an amazingly useful tool in an emergency. Don't forget to prepare driving directions and take along a map so you'll know how to get to the veterinary hospital. If you have to rely on a commercial shipper or friend to haul your horse, know well in advance who to call and ALWAYS have a back-up plan in case of an emergency.

A horse that has severe lacerations or a potential fracture is one most likely to require a trip to a veterinary hospital. The important thing is to remain calm and think the situation through. Many injuries are made worse by not taking the appropriate course of action prior to ship-

ping the animal. If the emergency happens at home, try to get your vet there as quickly as possible. If you are already away from home with the injured horse, try to obtain a veterinary evaluation before transporting the severely injured animal.

If the horse has a fracture or is going into shock from severe blood loss, supportive therapy is probably necessary prior to transport. You will want to keep a record of the horse's vital signs while waiting for the veterinarian to arrive. In addition to keeping the horse (and yourself) calm, it may be necessary to apply a pressure bandage to control the bleeding or to stabilize the limb in a splint prior to transporting the horse. I would discourage administering any type of sedative drugs (unless absolutely necessary) because most of them (especially the common ones found in the medicine cabinets in most barns) can have a negative impact on the health of an animal in shock. If a veterinarian is unavailable to come to the farm immediately, you should attempt to reach one by phone in order to talk over your horse's condition.

Once the wound has been bandaged, a horse with lacerations (usually on the limbs), can walk up into a trailer or van. This may not be the case for a horse with a splint on its leg. There are types of lower leg lacerations (typically those involving the tendons and/or ligaments) in which the application of a splint can be of great benefit. If the horse is suspected of having a fracture, it is very important that the injured leg have a properly-placed and

TRANSPORTING AN INJURED OR SICK HORSE

- Attempt to obtain veterinary evaluation before shipping an injured or sick horse.
- A horse with a fracture might require a splint before shipping.
- Extreme caution should be used when transporting a horse with colic; a sedative might be required.
- In addition to having the proper safety equipment, carry a cellular phone, a CB radio, or both in case an accident occurs.

well-wrapped splint before it is transported to the veterinary hospital.

Unfortunately, unless the horse is quite valuable and you have the financial wherewithal to attempt a fracture repair, the prognosis is typically unfavorable. If an attempt will be made to repair a fracture, it is important that the broken bones be stabilized right away to decrease the possibility of further damage. It is also important to prevent any of the fractured bones from penetrating the skin (assuming they have not already done so). If the skin is open, it will allow bacterial contamination of the fracture site which will adversely affect the prognosis even if the surgical repairs are exquisite. The proper application of a splint can affect the overall outcome of a fracture.

I keep harping on “proper application” of the splint and that is because the improper application of a splint can actually cause more harm than good. If at all possible, the splint application should be checked by a veterinarian prior to transport. If that is not possible, the description of splint application (in this book) using the full-leg length cut PVC piping at right angles placed over the top of a full-limb Robert Jones bandage should provide a protective and safe stabilization of an injured leg.

Shipping a horse with a splint on its leg can pose some problems. Generally, once a horse is in the van or trailer things are OK; it is the getting in and out that can be difficult. If at all possible, a trailer or van with a ramp that has a very shallow angle to the ground should be used. In addition, you will want to look for a spot to park the van or trailer so that its ramp has a rise, thus making the ramp as parallel to the ground as possible. The horse should be able to have a relatively straight shot into the vehicle.

Now, for the big question: do you ship the horse facing forward, backward, or in a box stall (if you have the choice, that is)? Obviously, you make do with what you have. For many of us, the horse will be transported in a

simple two-horse trailer. That will certainly work. There is some experimental evidence that it is less stressful for a horse to travel facing backwards. It may give it better stability with respect to balance. (In Europe they make a simple two-horse trailer that allows the horses to ride facing backwards.) From personal observation, I believe that an injured horse is better off in a trailer's standing stall versus the larger box stalls found in some large horse vans. The partitions and side wall in a trailer, combined with the breast bar and butt bar, will give the horse something to lean on for extra support during the trip.

Owners often ask me if I think somebody should ride in the trailer or box part of the van with the injured horse. In many states it is illegal to ride in any towed vehicle, including a horse van or trailer. The inside of a horse trailer can be a dangerous place to be (hence the law). I generally advise against having an attendant ride with the horse.

There are a number of transport companies that specialize in equine rescues and transportation of critically-injured horses. These specialists are starting to have a role at many national equestrian competitions. Among other things, they supply attendants who are specially trained in the handling of critically injured horses, trailers that can be peeled apart like the sections of an orange, or can be made flush with the ground. Some have special skids (to load unconscious or immobilized horses). Such trailers contain a harness-and-sling apparatus so that a horse with a fracture can be transported without bearing weight on the injured leg.

SHIPPING A HORSE WITH COLIC

In my experience, shipping a horse with a severe case of colic can be a dangerous and harrowing experience. If at all possible the horse should be seen by a veterinarian and stabilized prior to transport. The horse might require

intravenous fluid therapy, pain medication, and appropriate sedation prior to transport. If a sedative or tranquilizer is to be administered, great care should be taken to pick



Take precautions when transporting a sick or injured horse.

the proper drug and dosage because when the horse goes into shock, many of those drugs can have a negative impact on the horse's status. At times, when the horse is violent, sedating it may be the only safe way to transport it.

As discussed earlier in this book, every horse has a different response

to pain. A horse in pain can be extremely dangerous to be around. It can lash out with its front feet, kick viciously, and spontaneously throw itself to the ground. (Watch out; do not get in its way when it thrashes.) As a result of this unpredictable nature, going in the back of the trailer or van can be a very dangerous place even if it's only the time it would take to lead the horse inside and clip its headstall to a safety tie. If you use a leadline instead of a safety trailer tie with an emergency release, be sure to leave enough slack so that the horse won't strangle if it goes down.

I recommend carrying a knife with a serrated blade and a hammer in your vehicle. Use the knife if you have to cut the leadline or trailer tie. Use the hammer to knock loose the screw-type latches used to close the trailer ramp. Such latches often get bent and are hard to unscrew.

In addition, driving the vehicle also can be hazardous if the horse suddenly (and violently) shifts its weight in the trailer or goes down and thrashes. The driver should

always be prepared to react quickly and safely if such a problem occurs.

DEALING WITH A TRAILER ACCIDENT

Having an accident with a van or trailer carrying a horse is a nightmare. Always do everything in your power to prevent a vehicle accident with horses on board (or any time for that matter). If you are uncomfortable with the trailer rig or the size of a van, seek out the tutelage of an experienced driver. Put in practice time driving your truck and trailer combination before your first equine passenger goes along on a trip. Remember to pay attention to the weather conditions — especially if you are preparing for a long journey.

Probably one of the biggest mistakes people make is to drive the van or trailer like a car. Remember that with all the extra weight, everything is increased (i.e., stopping distance, the number of car lengths you should be behind the vehicle in front of you, turning ratios, etc...). Your reaction time must be good, but don't slam on the brakes if you can avoid it! Being safe means no map reading, no eating a fast food meal sprawled out across your lap, and NO calling on the cellular phone while you are driving. Remember, there is a 30% greater chance of being in an accident if you are driving and cell phoning at the same time. If you do not have a co-pilot to help with these things, pull over and stop before you pause to read the map, eat the snack, or make the call.

The extra weight of the trailer or van means the stopping distance could double. You should increase the space between your vehicle and the one you are following by one car-length for every speed increase of ten miles an hour. Be aware of approaching tractor-trailers; when they pass you the air currents will tend to push the vehicles apart. You should be ready to compensate for this. Try and watch what the cars are doing as far ahead as your

line of sight will allow — if you see a brake light come on, decrease your speed— even if the vehicle immediately in front of you doesn't slow down right away. The driver of the car up front might not be as aware of what's going on as you are!).

Always watch for sharp curves and traffic getting on and off ramps — remember, any sudden moves you make will bounce your precious cargo around. If you do have to slow down fast, it generally is better to do it in a straight line rather than around a curve. In other words, if approaching a curve too fast, it is better to brake hard in a straight line and then enter the curve more gently than to brake hard while in the curve.

Also remember all the safety items. If your trailer has brakes make sure they work and are adjusted appropriately. Make sure that all the trailer lights are working and that there are enough of them on the back — this can help reduce the chance of a rear end collision. Also make sure that you have an approved fire extinguisher.

If an accident does occur, it will be very important to get aid as quickly as possible. The presence of a cellular phone or a CB radio plays an important role here. Remember that not all parts of the countryside have cellular service, so a CB radio is a good back-up. Pay attention to the road signs and know what cell phone number will get you directly to the state police. Truckers and other road warriors use CB channel 19 while many emergency agencies and the state police often monitor CB channel 9. Make sure that whoever you end up talking to knows that you have (or might have) injured horses and that a veterinarian is also requested.

Immediately after the accident, if the trailer or van is upright and the horses can be safely accessed, you will want to evaluate them and apply any first aid that might be required. Be extremely careful opening any door on the vehicle (even the little tack compartment or escape

doors designed for people, not horses). If a horse has broken loose from its ties during the accident, it could be free in the trailer and if it is panicked enough, it will attempt to jump out of any escape route possible. You **DO NOT** want to unload the horses on the highway. There have been many sad reports where a frightened horse has survived the first accident, only to break loose from its handler and run into oncoming traffic, causing both horse and human fatalities. If there is no danger of fire from a ruptured gas tank, wait to unload the horses until the police arrive and can supervise and stop traffic if it is necessary to unload a horse.

Hopefully, if the situation involves a fire, you will have a fire extinguisher and enough people will stop to assist so there will be no need to unload on the side of the highway until it is safe to do so.

If the trailer or van is overturned, you should **NOT** attempt to rescue any trapped horses until safety crews appear on the scene to provide help and advice. The inside of a vehicle with a trapped horse is an extremely dangerous place. In addition, the emergency crews should have the appropriate equipment to “extract” the horse safely.

Depending on the animals’ injuries, the safest way (for the people and the horses) to extract them might be for a veterinarian to place them under anesthesia for the removal process. If possible, a veterinarian should work with the police and rescue personnel to develop a plan of action. Oddly enough, many horses lay down rather quietly while trapped, only struggling intermittently, while their rescue is organized. Remember, the most important things are to get emergency help immediately and not make the situation more dangerous by making rash errors of judgment.

GLOSSARY

Abdominal breathing — The breathing pattern typical of a horse with COPD (chronic obstructive pulmonary disease.) A pronounced effort of the abdominal muscles can be observed at the end of exhalation.

Agalactia — Absence or failure to secrete milk.

Amniotic sac — The extra embryonic membrane which contains the fetus and the amniotic fluid.

Anaphylactic shock — Shock that is caused by a severe allergic reaction causing cardiovascular collapse and thus dangerously low blood pressure.

Aspiration pneumonia — A particularly severe form of pneumonia caused by the inhalation of feed material. Often related to choke, but also can result from neurologic disorders affecting the swallowing mechanism, inappropriate oral drenching, or use of defective nipples when bottle feeding foals.

Banamine — A non-steroidal anti-inflammatory drug that because of the risk of toxic side-effects should be used only under the advisement of a veterinarian.

Botulism — A disease caused by the bacterium *Clostridium botulinum* that causes profound weakness from muscle paralysis and potentially death.

Caslick surgery — A minor surgical procedure which involves suturing part of the vulvar lips together.

Choke — A situation where there is an obstruction of the esophagus, typically with feed material.

Colic — A Greek word that means “affecting the bowels.”

Colitis — Inflammation within the colon caused by any number of disease processes.

COPD (chronic obstructive pulmonary disease) — An allergic airway disease similar to asthma in humans that often is referred to as heaves.

Capillary refill time — The amount of time it takes for the blood to return to the gums after pressing firmly on the mucous membranes, then removing the finger. In a healthy horse, it should take about two seconds for the color to return.

Chorioallantois — The area of the placenta that has the most intimate contact with the uterus and therefore is involved in the transfer of oxygen to the fetus.

Colostometer — A device for measuring the quality of colostrum.

Delayed pneumothorax — If a chest wound is in an area under the leg or between the legs, it can lead more slowly to a pneumothorax as the leak can be intermittent and dependent on leg movement.

Dystocia — Abnormal labor or birth.

Electrolytes — Sodium, chloride, potassium, calcium, and magnesium are some of the most important physiological electrolytes.

Enteritis — Inflammation within the intestine caused by any one of a number of disease processes.

Equine degenerative myelopathy — A spinal cord disease, typically of young horses, that can be a cause of ataxia.

Equine protozoal myeloencephalitis — A disease that affects the central nervous system and is caused by the protozoal organism, *Sarcocystis neurona*.

First aid — Emergency care and treatment of an injured or ill animal (person) before complete medical and surgical treatment can be secured.

- Flunixin meglumine** — The chemical name for Banamine.
- Foot abscess** — A focus of infection, usually under the sole, beneath the insensitive horn tissue of the foot. A very common cause of lameness, generally resulting from a minor puncture wound to the foot that seeds bacteria within the sensitive tissue.
- Gestational length** — The period of time a fetus is developing in the body. In a horse, gestational length is approximately 335 days.
- Golden period of wound repair** — Essentially considered to be the six hours following the creation of a wound. Wounds repaired within the “golden period” have a lower risk of complication from infection than wounds that are long-standing.
- Gravel** — A foot abscess that ruptures near the coronary band.
- Hydrotherapy** — The use of water to treat leg injuries/lamenesses.
- Labor** — The process by which the fetus is expelled through the vagina to the outside world. Labor occurs in three stages.
- Laminitis (founder)** — An inflammatory condition that occurs near the area where the sensitive and insensitive tissue forms the connection between the coffin bone and hoof.
- Laminae** — The microscopic interdigitating sensitive and insensitive tissue that connects the coffin bone and hoof wall.
- Peritonitis** — The development of an inflammatory process within the abdominal cavity.
- Phenylbutazone** — A non-steroidal anti-inflammatory drug that, because of the risk of toxic side-effects, should be used only under the advisement of a veterinarian.
- Placenta** — An organ characteristic of true mammals during pregnancy, joining mother and fetus, providing endocrine secretion and selective exchange of soluble blood-borne substances through apposition of uterus and fetal tissue.
- Pneumonia** — A generic term for inflammation of the lung.

Pneumothorax — A potential complication to wounds around the chest and thoracic cavity. Wounds to the chest can break the negative seal between the lung itself and the cavity that houses them causing the lung to collapse.

Potomac horse fever — A disease caused by the organism *Ehrlichia risticii* that can cause depression, inappetence, fever, diarrhea, and laminitis.

PVC — Polyvinyl chloride pipe that can be cut with a power saw for making splint material (be sure it is thick enough to provide support without being excessively heavy; typically 1/4 to 1/2 inch depending on the size of the horse/foal).

Red bag — The condition in which the chorion prematurely separates from the allantois during labor, so that the fetus is deprived of oxygen.

Retained placenta — In the horse, failure to expel the placenta following delivery of the foal.

Rhabdomyolysis (tying-up) — A muscle syndrome often associated with exercise and high concentrate diets; also known as Monday morning disease.

Robert Jones bandage — A very thick leg bandage often used to help immobilize severe lacerations or fractures.

Salmonella — A bacterium that can cause severe diarrhea.

Salmonellosis — A disease caused by bacteria in the Salmonella family that can cause depression, inappetence, fever, diarrhea, and laminitis.

Shock — A physiological effect caused by severe dehydration, severe blood loss, or the absorption of bacterial toxins (usually gastrointestinal in origin), resulting in low blood pressure and poor blood flow.

Strangles — A contagious bacterial disease caused by *Streptococcus equi* infection

Tendonitis (bowed tendon) — An inflammation of tendon tissue usually resulting from excessive forces being applied to the tendons, which causes a tearing of the tendon fibers. Hallmark signs are heat, pain, and swelling of the damaged tissue.

Toxic mucous membranes — A dark purple to bright red color of the mucous membranes (often the darkest purple forming a line just above the gum line and around the teeth) indicating the presence of “toxic” shock.

Toxic shock — Shock that is mediated by the absorption of bacterial toxins (usually from the intestine).

Umbilical cord — The structure which joins the fetus and dam containing the blood supply and excretory organ for the fetus.

INDEX

Abdominal pain. 36, 41, 89, 96	Bizarre behavior.....53
Abdominal wounds.....40	Blood loss.....30, 56
Abortion.....87	Bottle feeding.....100
Abscess 24, 33, 59, 106	Botulism40, 54
Agalactia87, 95	Capillary refill time18
Aggressive behavior98, 99, 101	Caslick surgery88
Airway obstruction.....47, 48	Castration.....57
Allergic reactions (systemic)..... 47, 105	Choke.....40
Allergic reactions (local)....107	Chorioallantois90
Amniotic sac90, 92	Cleft palate40
Anaphylactic reaction105	Cold therapy.....28, 33
Anaphylactic shock.....105	Colic 11, 36, 89, 91, 93, 96
Anemia.....87	Colostometer96
Aspiration pneumonia41	Colostrum86, 94, 100
Ataxia50	Conjunctiva.....79, 80, 82
Banamine.....23	Contagious disease43
	Cooling.....28, 76

COPD (Chronic obstructive pulmonary disease)	46	Equine degenerative myelopathy	51
Cornea.....	78, 79, 80, 82	Equine protozoal myeloencephalitis.....	51
Corneal ulcer	81	Equine rescue.....	111, 115
Coughing	45	Equine wobbler syndrome..	51
Dehydration.....	42	Esophageal obstruction	40
Delayed pneumothorax	49	Ethmoid hematoma.....	59
Depression.....	12, 33, 47, 106	Exercise exhaustion	63
Diarrhea	42, 93	Exercise-induced pulmonary hemorrhage	58
Difficulty rising.....	54	Eye lacerations/punctures ...	84
Dimethyl-sulfoxide (DMSO)	33	Eyelid laceration.....	83
Dry mucous membranes	75	Eye trauma.....	84
Dysmature foals	88, 93	Failure of passive transfer ...	95
Dystocia	87, 91, 92	Feed coming from nostrils ..	40
Electric heating pads	33	Feeding habits.....	36, 37
Electrolytes	42	Fescue grass	87
Elevated heart rate...18, 34, 40		Fescue toxicity.....	87
Elevated respiratory rate	40	Fever.....	12, 33, 45, 47
Emergency transportation .	108	Flank watching.....	16, 37
Endurance horses (problems associated with)	63, 66, 76	Flipping over backwards.....	51
Enemas.....	96	Foal rejection.....	97, 98
Enteritis	42	Foot abscess	24, 29
Entropion.....	84	Fractures	29, 51
Epilepsy	53	Frozen colostrum	96

Frozen water.....	77	Inability to swallow	54
Fungal eye infection	82, 83	Inappetence.....	33, 41, 106
Gestational length	86, 88, 93, 95	Incoordination.....	51
Golden Period of wound repair	32	Increased capillary refill time	42
Grain overload	38	Insect bite	104
Guttural pouch mycosis	58	Intestine herniation.....	40
Head injury.....	51	Irregular heart rhythm.....	64
Heat therapy.....	28	Japanese yew.....	39
Heaves.....	46	Kicking at belly	37
Hemorrhage.....	31, 57	Labor	88, 91, 97
Hemorrhage from ear canals	57	Lacerations.....	12, 22, 30
Hemorrhage from nostrils...	58	Lactic acid.....	63
Hemorrhage from rectum ...	59	Laminae.....	25
Hemorrhage from uterine artery	60	Laminitis.....	25, 26, 27
Hemorrhage related to castration	57	Lip curling	37
Hives	104	Low body temperature	53
Hot packing.....	53, 106	Mammary gland	94
Hydrotherapy	32	Mania	53
Hygiene.....	43	Meconium impaction	96
Hyperkalemic periodic paralysis (HYPP).....	77	Medications.....	25
Hyperthermia	76	Metabolic emergencies	62
Hypoglycemia.....	53	Monensin	39
		Moon blindness.....	80, 82
		Muscle cramps.....	64

Muscle spasm	30, 77	Premature foals	93, 94
Muscle tremors	54	Premature placental separation.....	92
Nasal discharge	41	Pressure bandage.....	22, 30, 31
Neck fracture.....	51	Pseudomonas eye infection	83
Neonatal emergencies.....	95	PVC	29, 110
Neonatal immunity	87, 94	Rabies.....	53, 87
Noisy breathing.....	47	Rabies vaccination	54, 87
Ocular emergencies	81, 82	Record keeping	86
Ocular pain.....	78, 81, 82	Red bag.....	92, 93
Orphaned foal	96	Red maple leaf toxicity.....	39
Overeating	26, 38	Relaxed anus	64
Pale mucous membranes	45, 57	Respiratory crisis.....	47
Pawing	16, 37	Respiratory disease	46
Peritonitis	40	Respiratory distress.....	48
Personality change.....	53	Retained placenta	91
Phenylbutazone	25, 33	Robert Jones bandage ...	29, 32
Physical examination.....	34	Rhabdomyolysis (tying-up).....	34, 35, 64
Placenta.....	87, 90, 97, 102	Rolling.....	37
Placentitis	91, 93	Salmonella	42
Pneumonia	93	Sandfly bites	107
Pneumothorax	48	Seizures.....	52
Posturing to urinate	37	Selenium	87
Potassium chloride.....	42	Severe dehydration	42
Potomac horse fever	26, 42	Shipping a colic	111
Pregnancy	86, 87, 88		

Shipping an injured horse.108	Trailer accidents.....112
Shipping a splinted horse .110	Umbilical cord.....90
Shock16, 40, 57	Uveitis80, 82
Skin tent.....73	Vaccinations 30, 33, 45, 86, 105
Snake bite48	Vaccination abscess.....33
Sodium bicarbonate42	Vaccination reaction.....33
Sodium chloride.....42	Vaginal discharge93
Spinal cord abnormalities....50	Vehicle safety.....108, 114
Splint application22, 29, 32	Viral encephalitis.....53
Strangles46	Vital signs16, 19, 107
Stretching.....16, 37	Vitamin E87
Sweating46, 89	Water coming from nostrils.40
Tacky mucous membranes..75	Weak foals54, 95
Tail flagging.....37	Weakness54
Tears.....79, 81	White muscle disease87
Tendonitis (bowed tendon).27	Wound cleansing.....32
Tetanus protection30, 34	Wound dressing30, 32, 57
Thermometer breaking in rectum59	Wounds into thoracic cavity 48
Third eyelid79, 82	
Three-day event horses (prob- lems associated with).34, 76	
Thumps.....75	
Toxic mucous membranes .42	
Toxin ingestion.....39	
Trachea44, 47, 48	

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- <http://www.thehorse.com/>
The Horse Interactive: Your Online Guide to Equine Health Care
- <http://www.aaep.org/client.htm>
Client Education section of the American Association of Equine Practitioners
- <http://www.erc.on.ca/>
The Equine Research Centre, Guelph, Ontario, Canada
(Follow the “Resource Centre” link to “Health Care.”)
- <http://www.horseadvice.com/articles/diseases/firstaid/firstaidmenu.html>
First Aid and Treatment section of The Horseman’s Advisor
- <http://netvet.wustl.edu/>
NetVet — compendium of veterinary and animal care links
- <http://www.haynet.net/vet.html>
The Hay.net’s veterinary resources page

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Anne M. Eberhardt, 26, 31; Kendra
Bond, 27; Michael A. Ball, 28.

CHAPTER 5

Michael A. Ball, 36, 38, 41;
Kendra Bond, 42.

CHAPTER 6

Michael A. Ball, 44, 46.

CHAPTER 7

Cheryl Manista, 50;
Anne M. Eberhardt, 54.

CHAPTER 8

The Horse, 56; Anne M. Eberhardt,
60.

CHAPTER 9

Michael A. Ball, 65-72.

CHAPTER 10

Anne M. Eberhardt, 81;
Michael A. Ball, 82, 84.

CHAPTER 11

Anne M. Eberhardt, 89, 94, 98;
Equipix, 101.

CHAPTER 12

Michael A. Ball, 106, 107.

CHAPTER 13

Anne M. Eberhardt, 112.

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Michael A. Ball, DVM, a native of upstate New York, worked professionally in the horse industry for six years



Michael A. Ball

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